JUSTO MIRANDA
& PAULA MERCADO

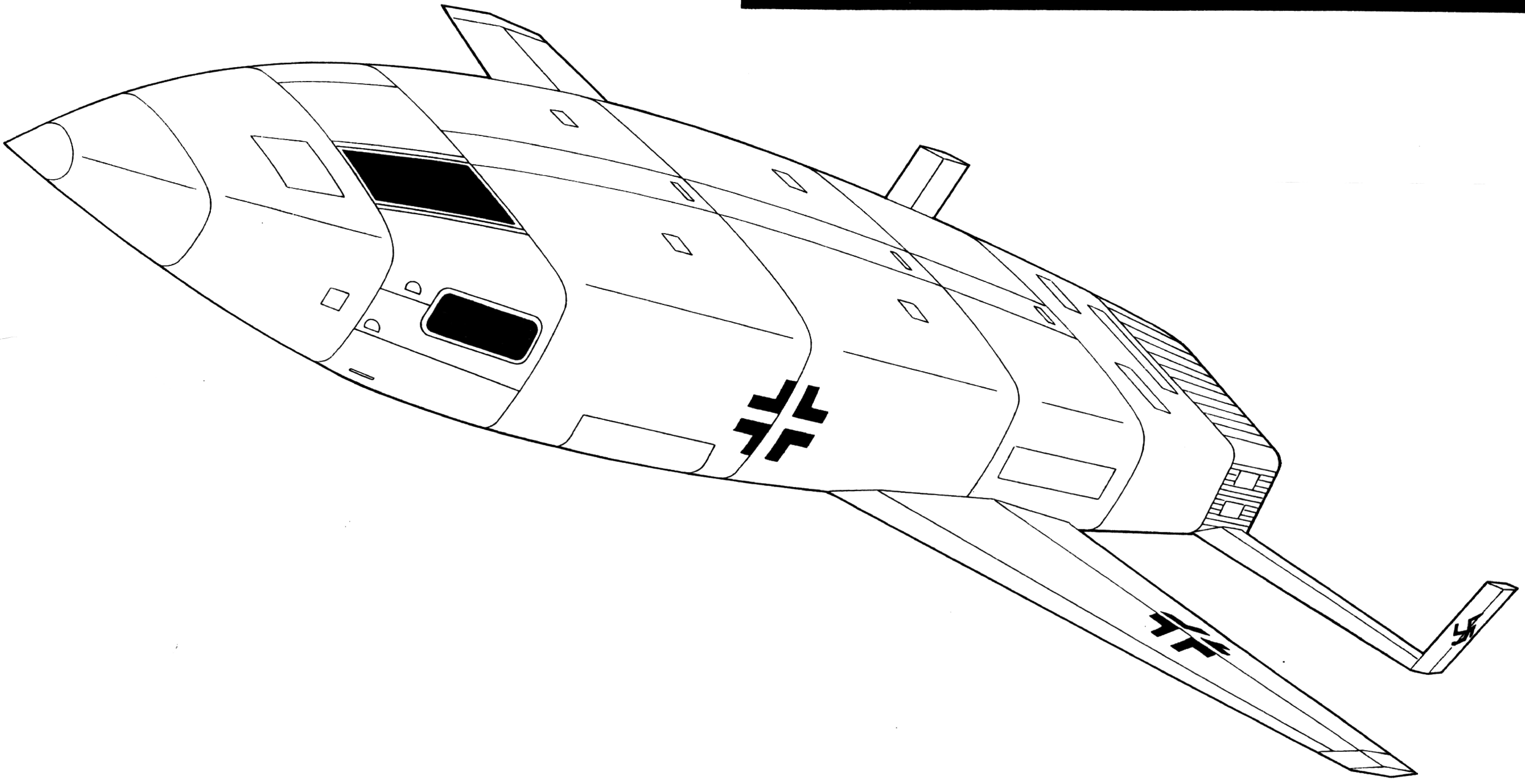
Reichdreams Research Services «PACKFILE n°2» German Rocket Planes

REICHDREAMS RESEARCH SERVICES

PACKFILE Nº. 2

"GERMAN ROCKET PLANES"

By Justo Miranda & Paula Mercado

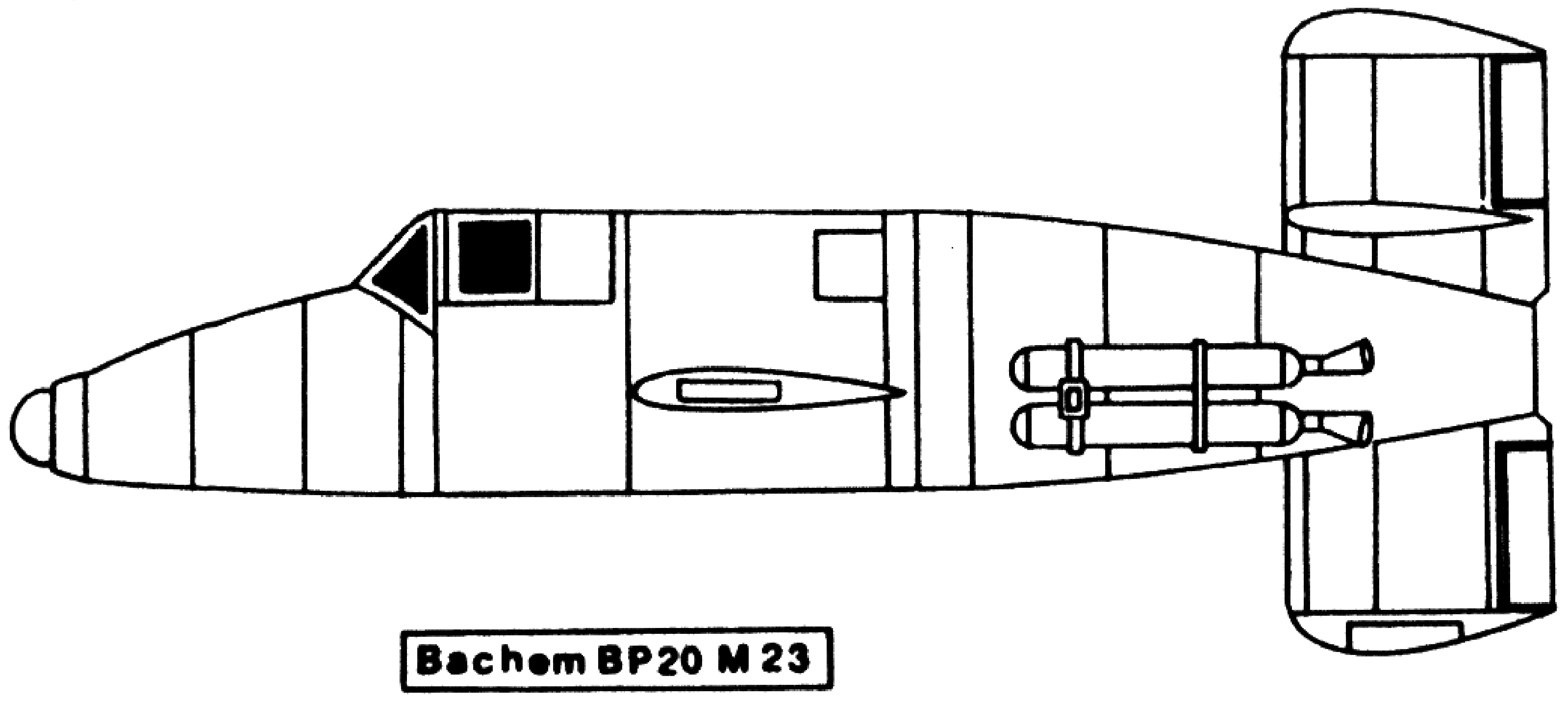


REICHDREAMS RESEARCH SERVICES
PACKFILE NO. 2
"GERMAN ROCKET PLANES"

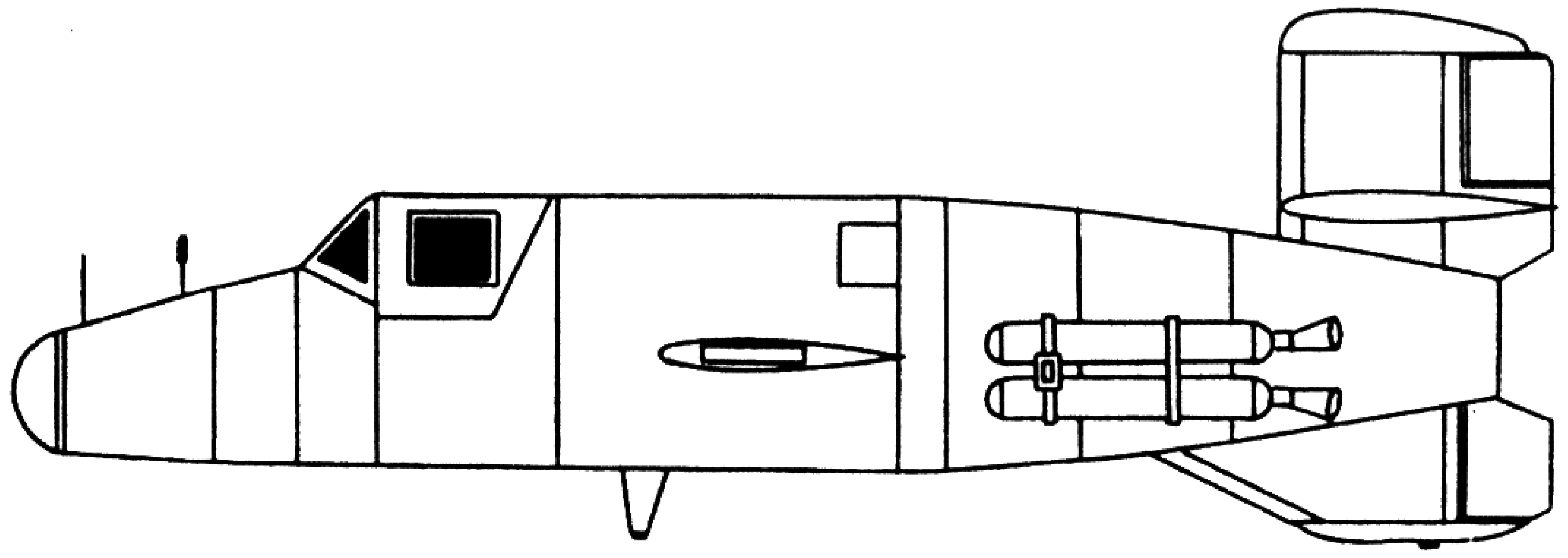
Arado Ar 234 R(a)
Arado Ar 234 R(b)
Arado E 381/I
Arado E 381/II
Arado E 381/III
Arado TEW 16/43-13
Arado TEW 16/43-15
Bachem Ba 349 A "Natter"
Bachem Ba 349 A-1 "Natter"
Bachem Ba 349 B "Natter
Blohm und Voss BV 40
Blohm und Voss BV P.178
Von Braun Interceptor (Stage I)
Von Braun Interceptor (Stage II)
DFS 194
DFS 228
DFS 230
DFS 332
DFS 346
DFS "Rammer"
EMW/A4b
EMW A9/A10
EMW A6
Espenlaub/Valier "Rak 3"
Espenlaub EA-1
Espenlaub E-15
Fieseler Fi 166 "Höhenjäger I"
Fieseler Fi 166 "Höhenjäger II"
Focke Wulf P.011.001 (PV)
Focke Wulf Ta 183 Ra-1
Focke Wulf P IV
Focke Wulf P VII "Flitzer"
Focke Wulf Ta 283
Focke Wulf Fw 250 "Super Lorin"
Focke Wulf "Triebflügel"
Focke Wulf "Volksjäger"
Focke Wulf "Rammjäger"
"Frau im Mond" Lunar Rocket
Gotha Go 345
Gotha "Rammer"
Heinkel He 112 V3
Heinkel He 176 V1
Heinkel He 176 V2
Heinkel He P.1077 "Julia I"
Heinkel He P.1077 "Julia II"
Horten HoXIIIB
Junkers EF-127 "Dolly"
Junkers EF.127 A "Wally"
Lippisch "Ente"
Lippisch/Fritz von Opel Rak 1929
Lippisch P01-113
Lippisch P01-114
Lippisch P01-115
Lippisch P01-116
Lippisch P01-117
Lippisch P01-118
Lippisch P01-119
Lippisch P05 (August 1941)
Lippisch P09 (May 1942)
Lippisch P11 (September 1942)
Lippisch P11 (December 1942)
Lippisch DM-1
Lippisch DM-1 (NACA #8)
Lippisch DM-2
Lippisch DM-3
Lippisch P.13a Entwurf I
Lippisch P.13a Entwurf II
Lippisch P.13a Entwurf III
Messerschmitt Me 163 A
Messerschmitt Me 163 B-1
Messerschmitt Me 163 C
Messerschmitt Me 263/Ju 248
Messerschmitt Me 262 C-1a "Heimatschützer I"
Messerschmitt Me 262 C-1b "Heimatschützer II"
Messerschmitt Me 262 C-3a "Heimatschützer III"
Messerschmitt Me 262 "Interceptor"
Messerschmitt Me 262 HG III Entwurf III
Messerschmitt Me P1092B
Messerschmitt Me P1103 (6 July 1944)
Messerschmitt Me P1103 (6 July 1944)
Messerschmitt Me P1103 (12 Setp 1944)
Messerschmitt Me P1104 (10 Aug 1944)
Messerschmitt Me P1104 (22 Sept 1944)
Messerschmitt Me P1103 B
Messerschmitt Me P1106 R
Opel-Saunders/Hatry "Rak-1"
Sänger Rocket Plane 1931
Sänger Bredt Rocket Bomber 1943
Siebel Mistel Projekt Entwurf I
Siebel Mistel Projekt Entwurf II
Sombold So.344
Valier Rocket Airplane Type 1
Valier Rocket Airplane Type 2
Valier Rocket Airplane Type 3
Valier Rocket Airplane Type 4
Valier RF-1
Zeppelin "Fliegende Panzerfaust"
Zeppelin "Rammer"

RAKETENJÄGER

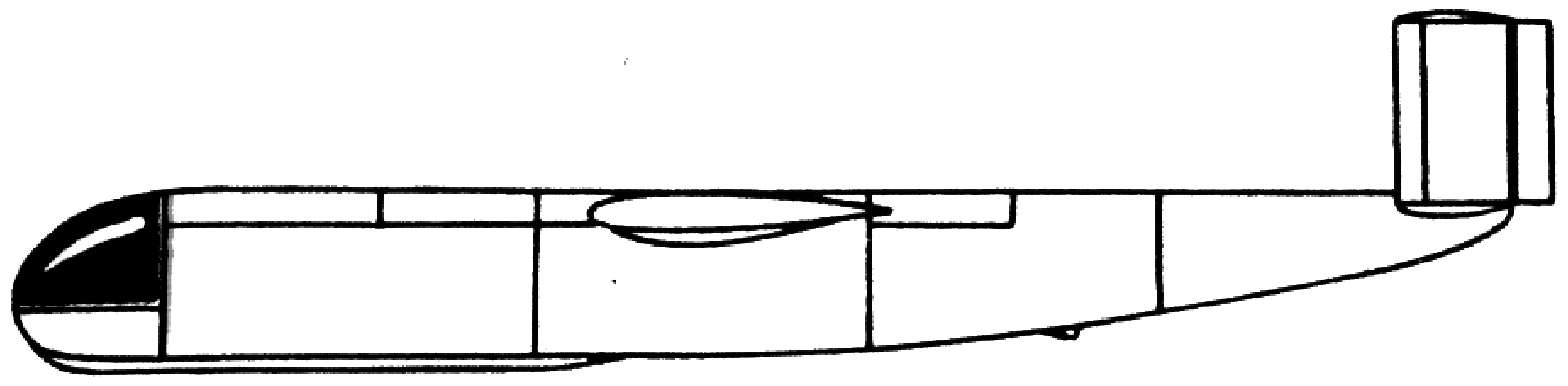
1/72 Scale



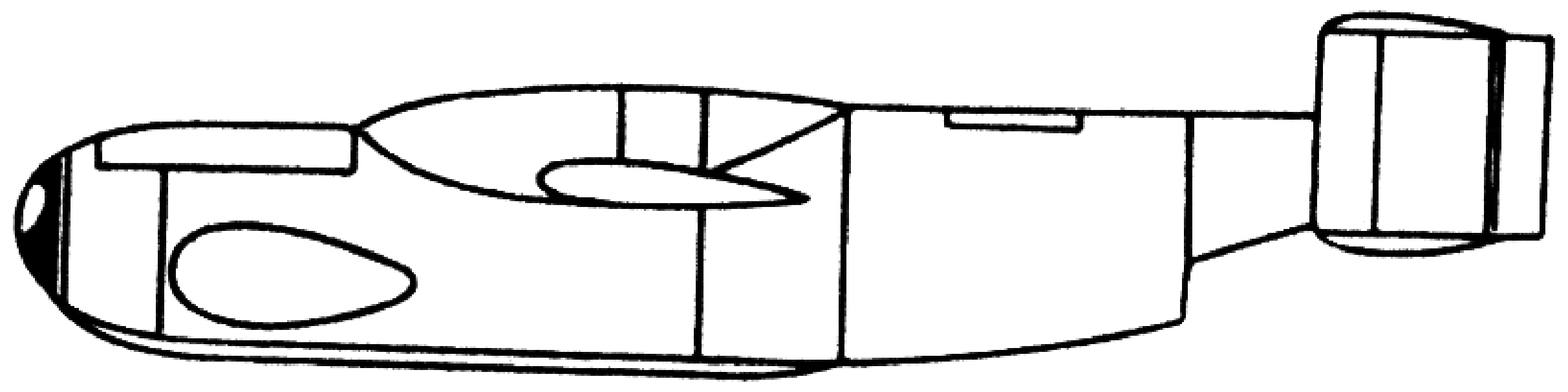
Bachem BP20 M 23



Bachem Ba349A



★ Arado E 381 (first version)



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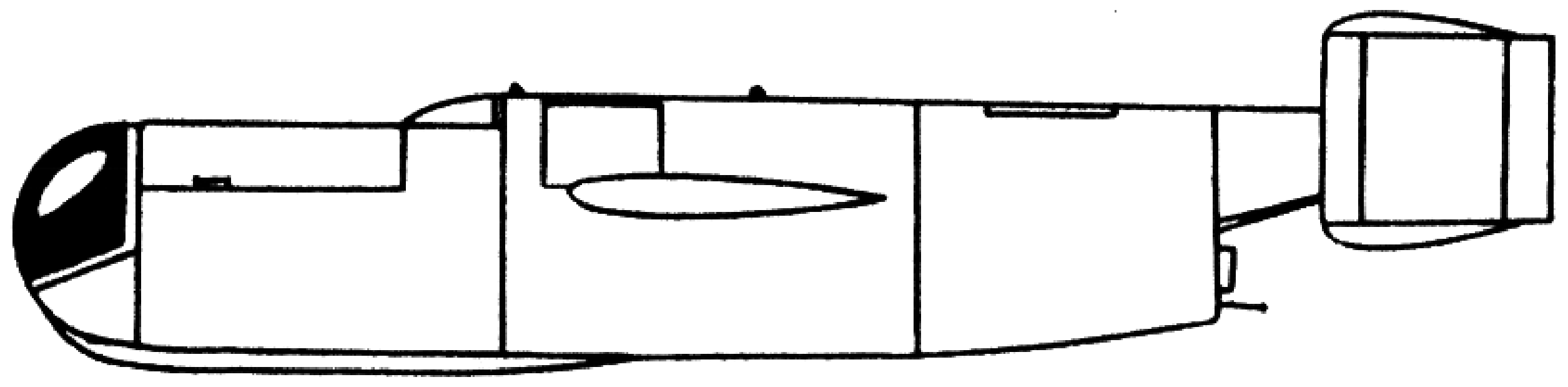

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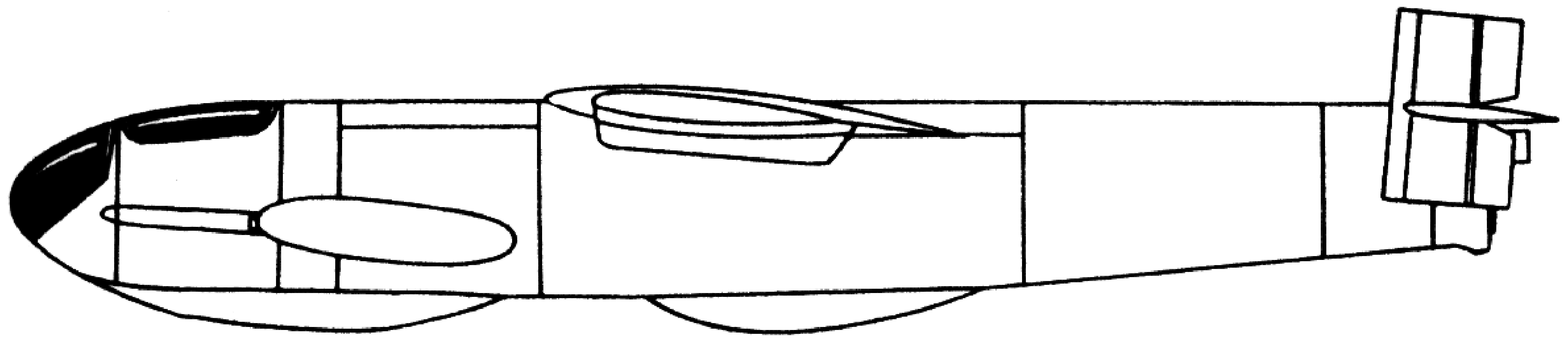
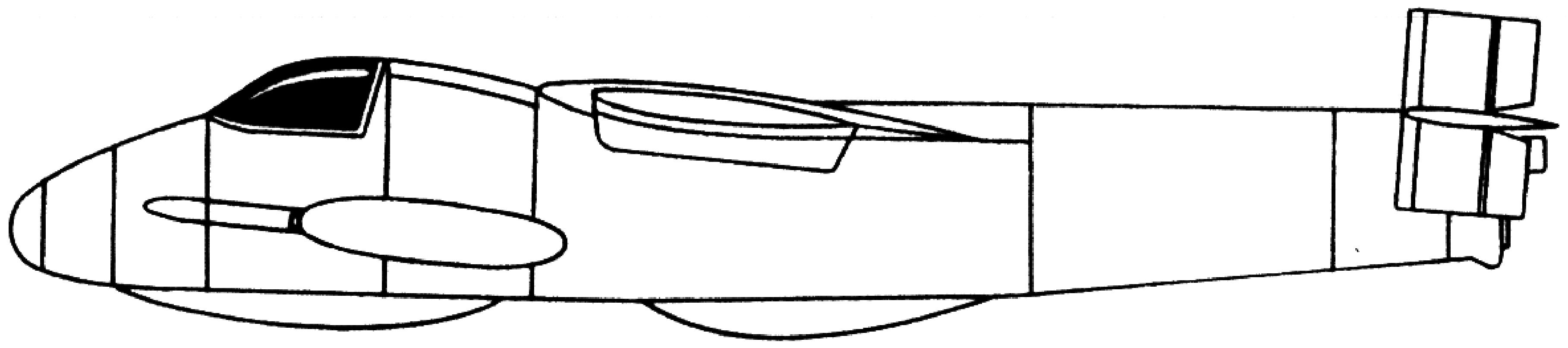
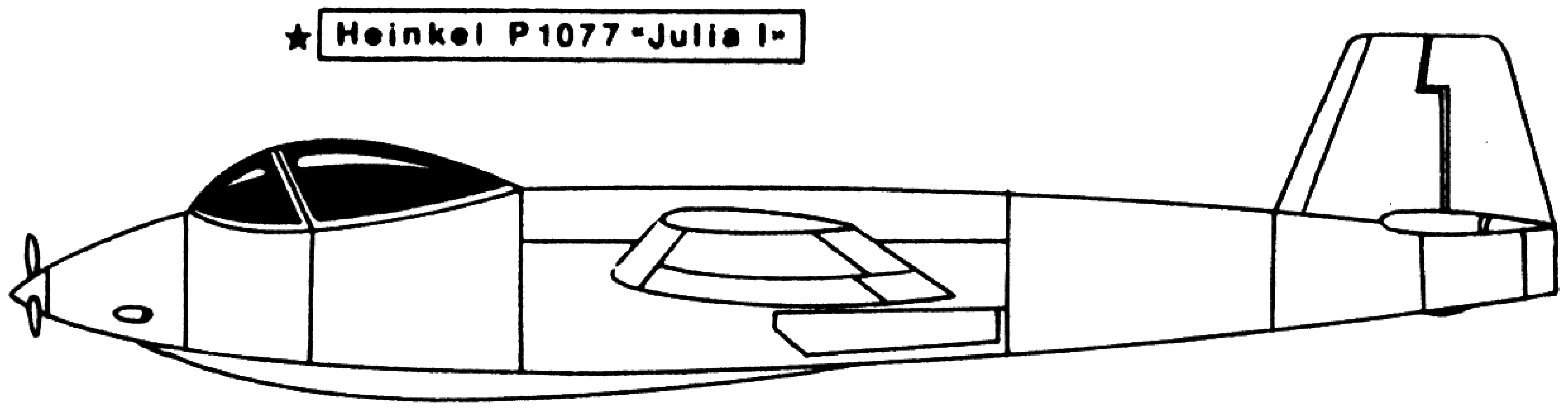


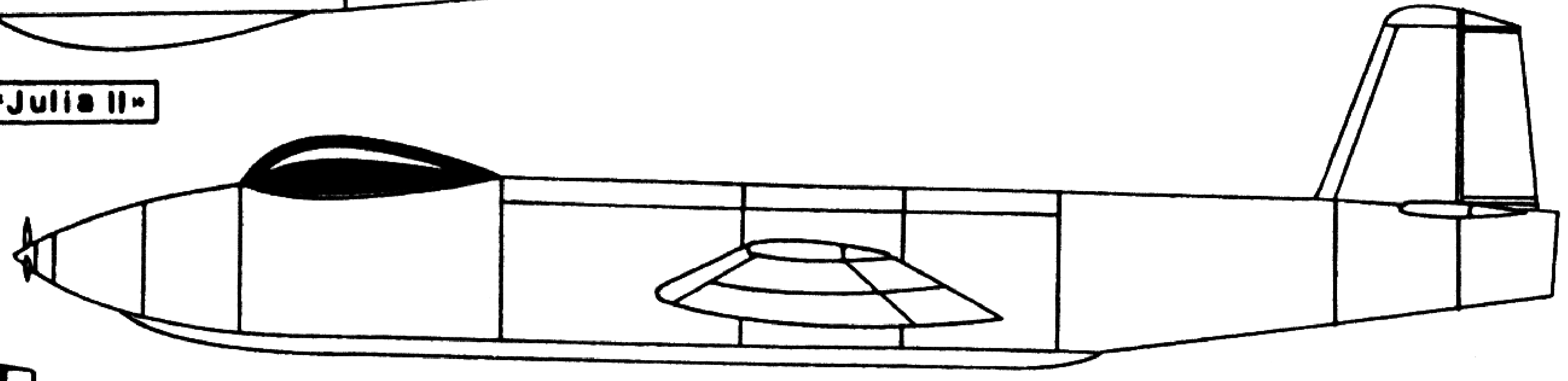
★ Heinkel P1077 «Julia I»



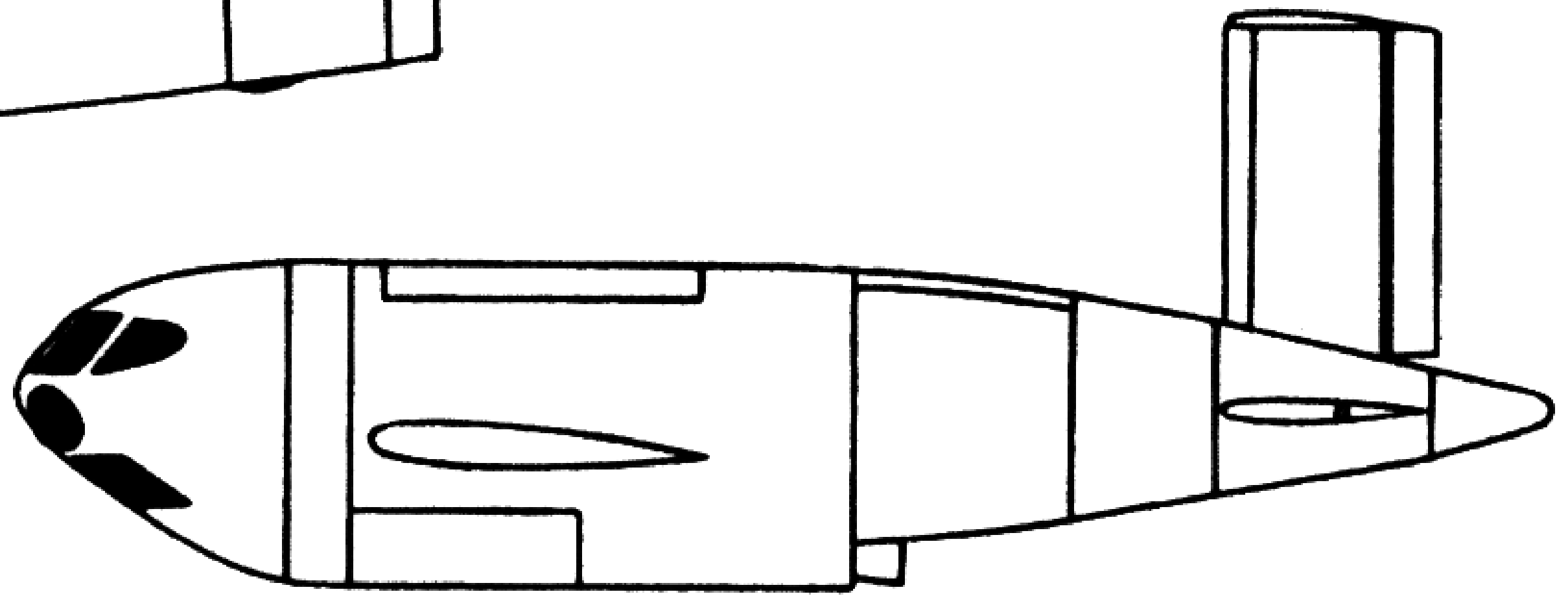
★ Heinkel P1077 «Julia II»



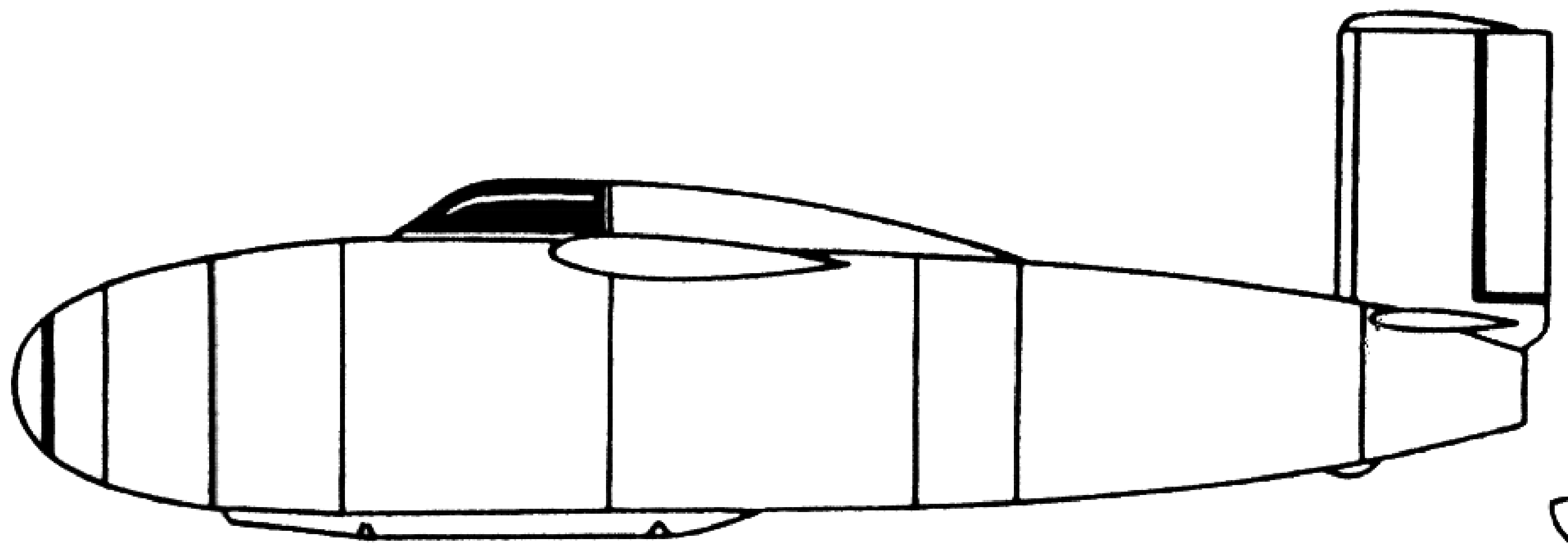
★ Junkers EF 126 «Elly»



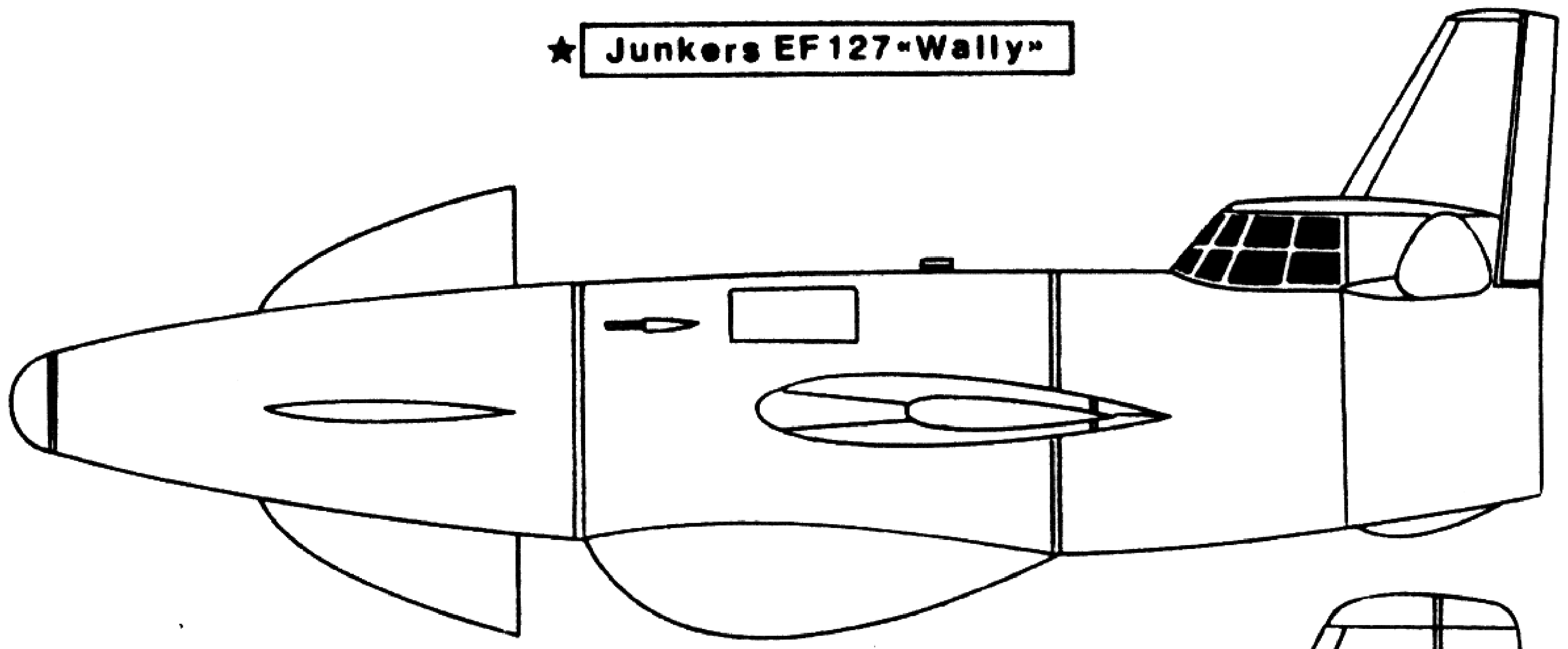
★ Junkers EF 127 «Wally»



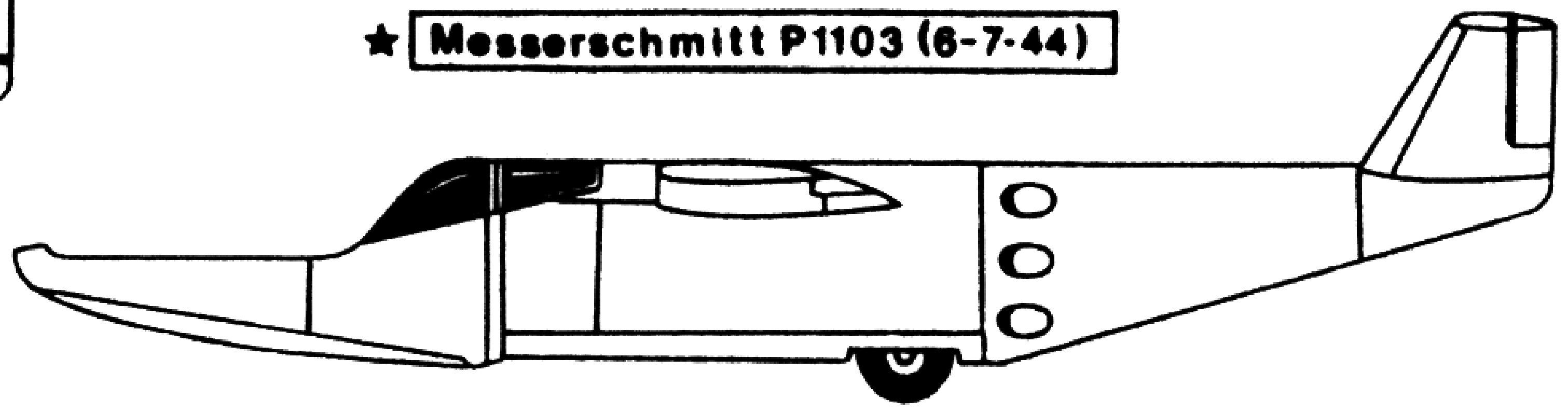
★ Messerschmitt P1103 (6-7-44)



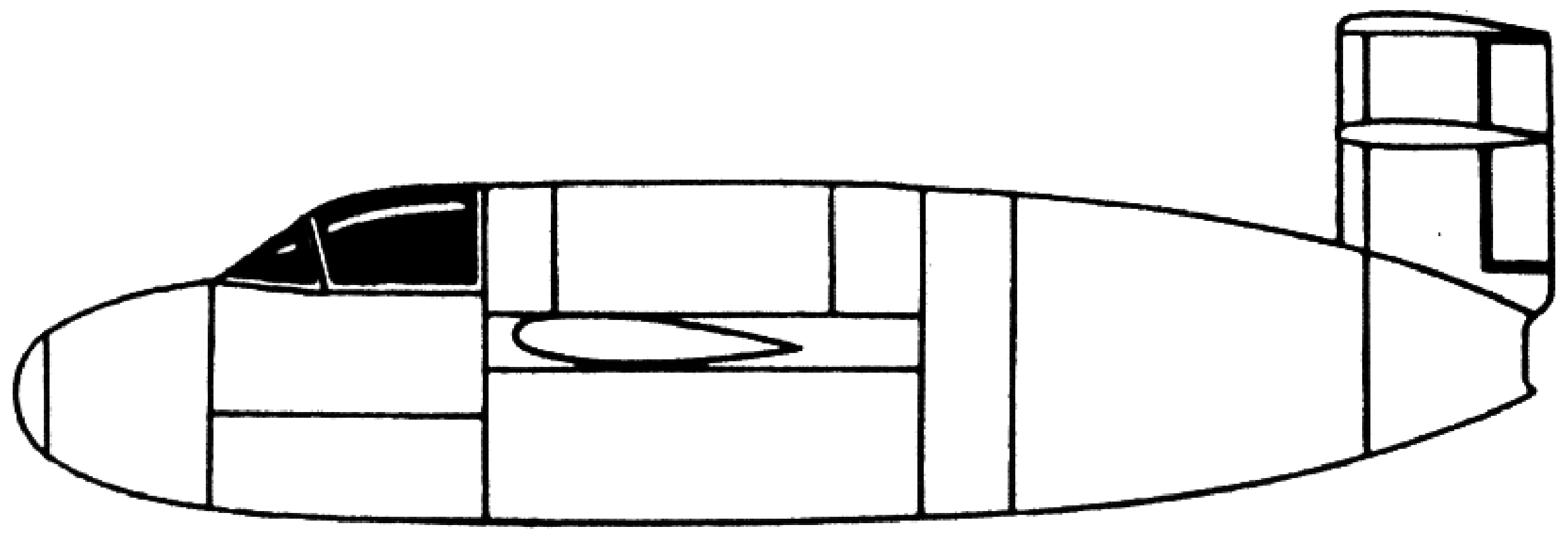
★ Messerschmitt P1104 (22-9-44)



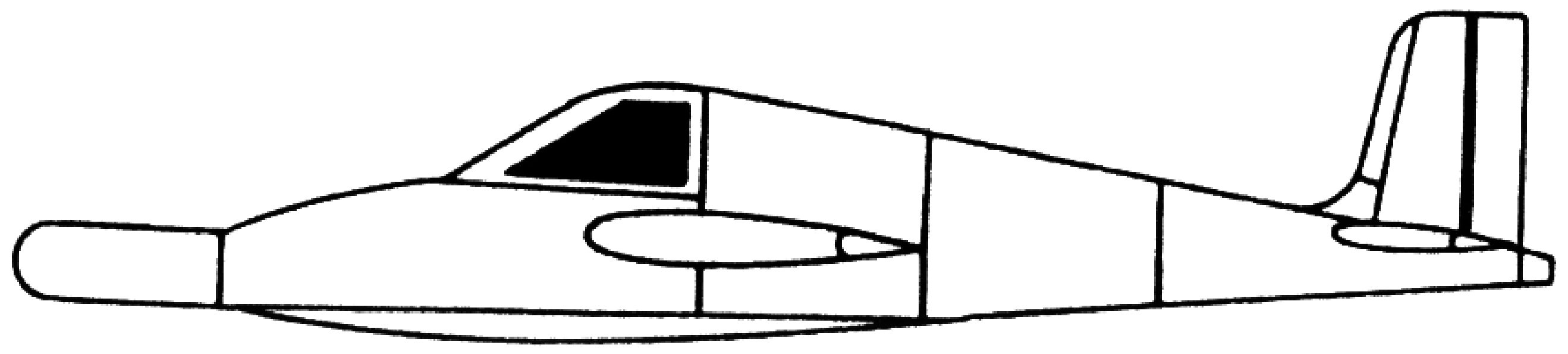
★ Sombold So344



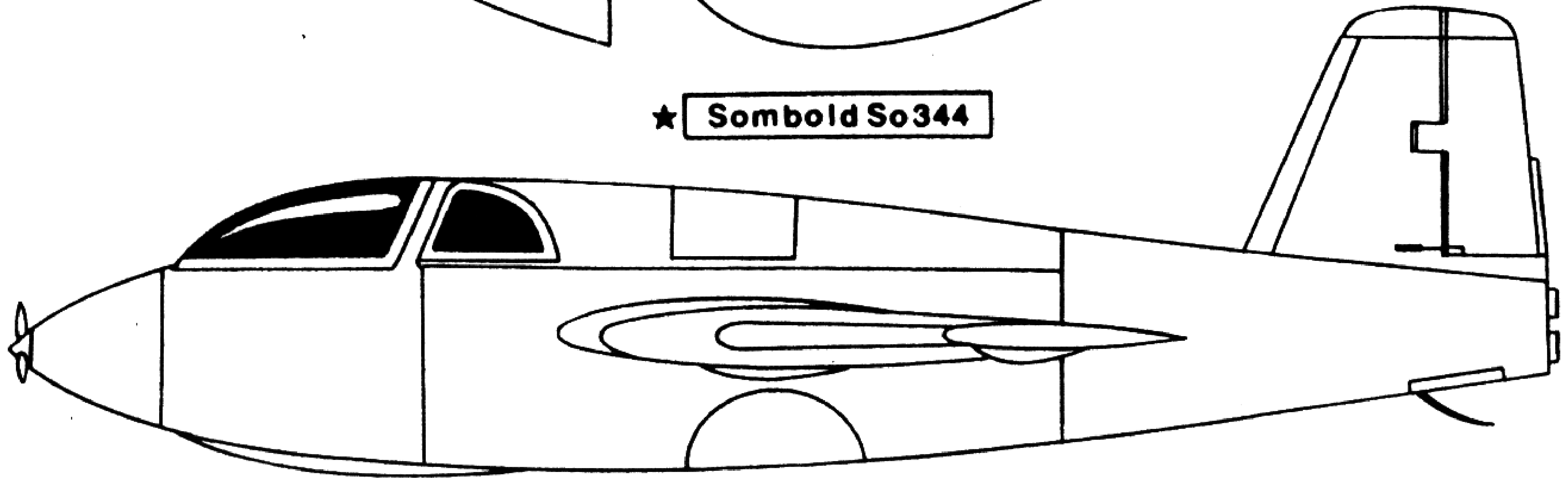
★ Zeppelin «Fliegende Panzerfaust»



★ Messerschmitt P1104 (10-8-44)

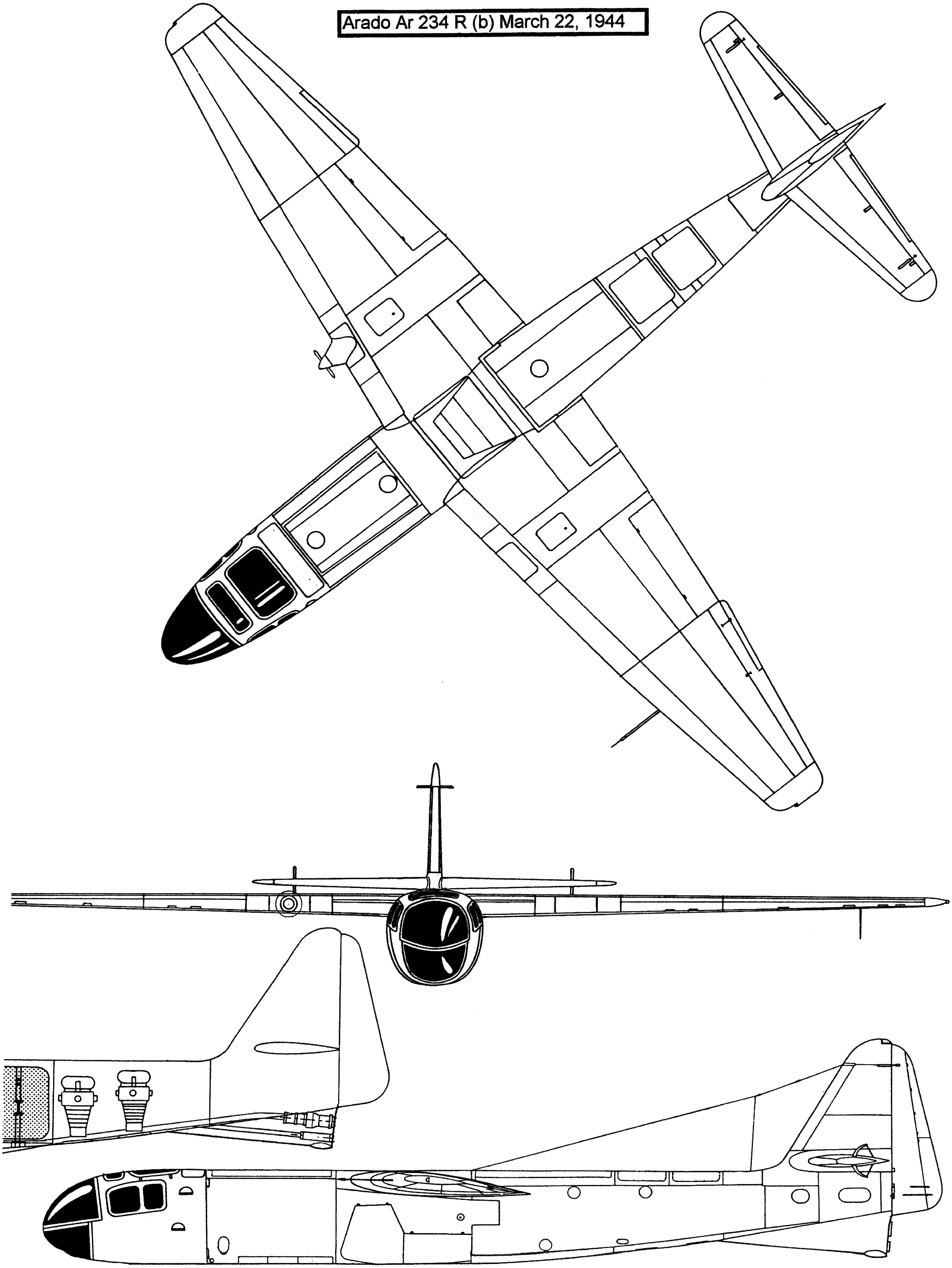


★ Zeppelin «Rammer»



Messerschmitt Me163 C

Arado Ar 234 R (b) March 22, 1944



1/72 scale

RECONNAISANCE VERSIONS OF THE AR234

Considering that the 234 had its origins as a reconnaissance airplane project, the designers of the company planned the adaptation to bomber versions aimed to carry cameras and sophisticated radar equipment. Thus, both the Ar 234 B-1 and the B-2b could carry two Rb 50/30 cameras in the rear bay.

To compete against the rocket-glider DFS 228, the company designed two rocket-propelled versions of the Ar 234 B in March 1944. One was the Ar 234 R (a), in which the two turbojets had been replaced by two nacelles each housing a Walter 509A engine rocket with a thrust of 1,500 kg. The other was the Ar 234 R (b), carrying a Walter 509 C rocket with two combustion chambers of 1,700 and 300 kg of thrust each, and had the advantage of avoiding the drag produced by the engines located in a conventional position.

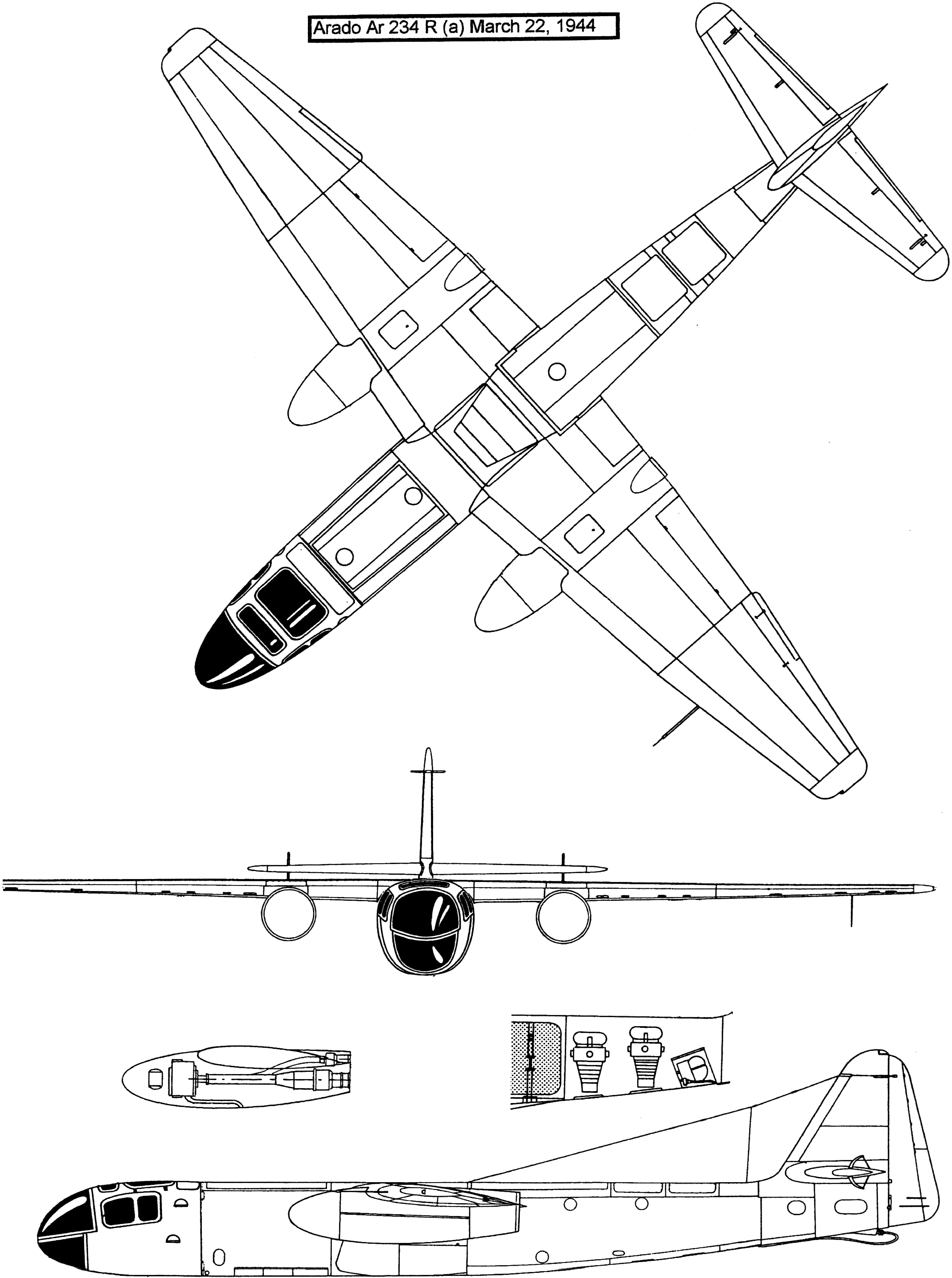
The plan was also to have some derived versions from the C series -The Ar 234 C-1, Ar 234 C-4, Ar 234 C-3/R2 and Ar 234 C-6- equipped with Rb 75/30 cameras and two MG 151/20 guns, located under the fuselage and shooting backwards.

There was another version, the Ar 234 C-5 “AWACS”, designed as airborne early warning aircraft. To that purpose, a FuG 240/4 Bremen radar with a 360^0 rotatory antenna, mounted on the back, would be installed within the lenticular fairing

TECHNICAL DATA

Type	reconnaissance airplane
Phase	design
Structure and cladding	metallic. Pressurised cockpit
Landing gear	tricycle type
Engine	see text
Fuel tanks (Ar 234 R)	one of T-Stoff and another of C-Stoff in the fuselage
Armament	none
Wingspan	14.4 m
Length	12.7 m
Height	4.32 m
Wing area	27 m^2
Ceiling	The Ar 234 R (a) should reach 16,500 m when taking off by its own means. The Ar 234 R (b) was towed until 8,000 m. by a Heinkel He 177 bomber and then climbed up to 17,000 m.

Arado Ar 234 R (a) March 22, 1944



1/72 scale

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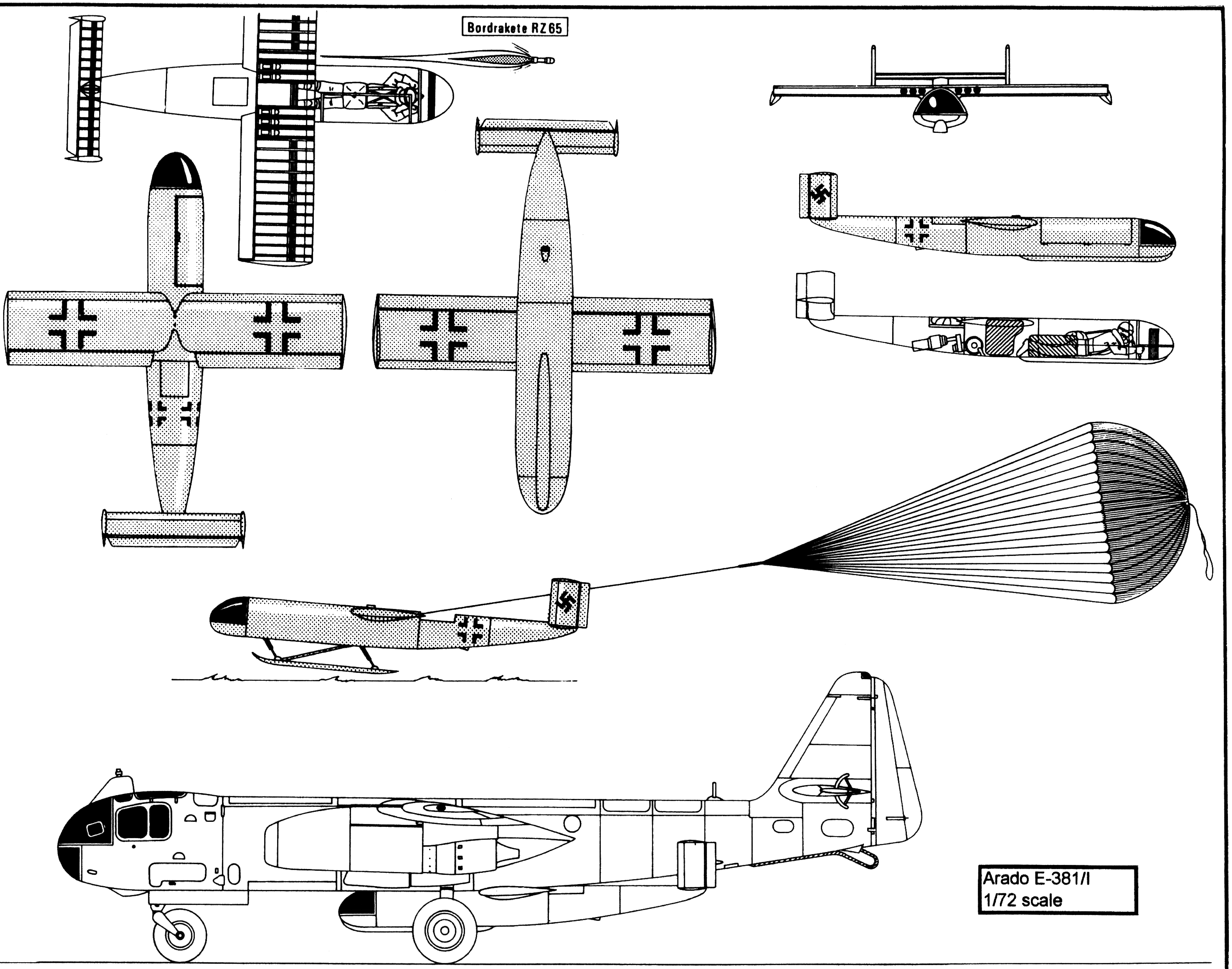
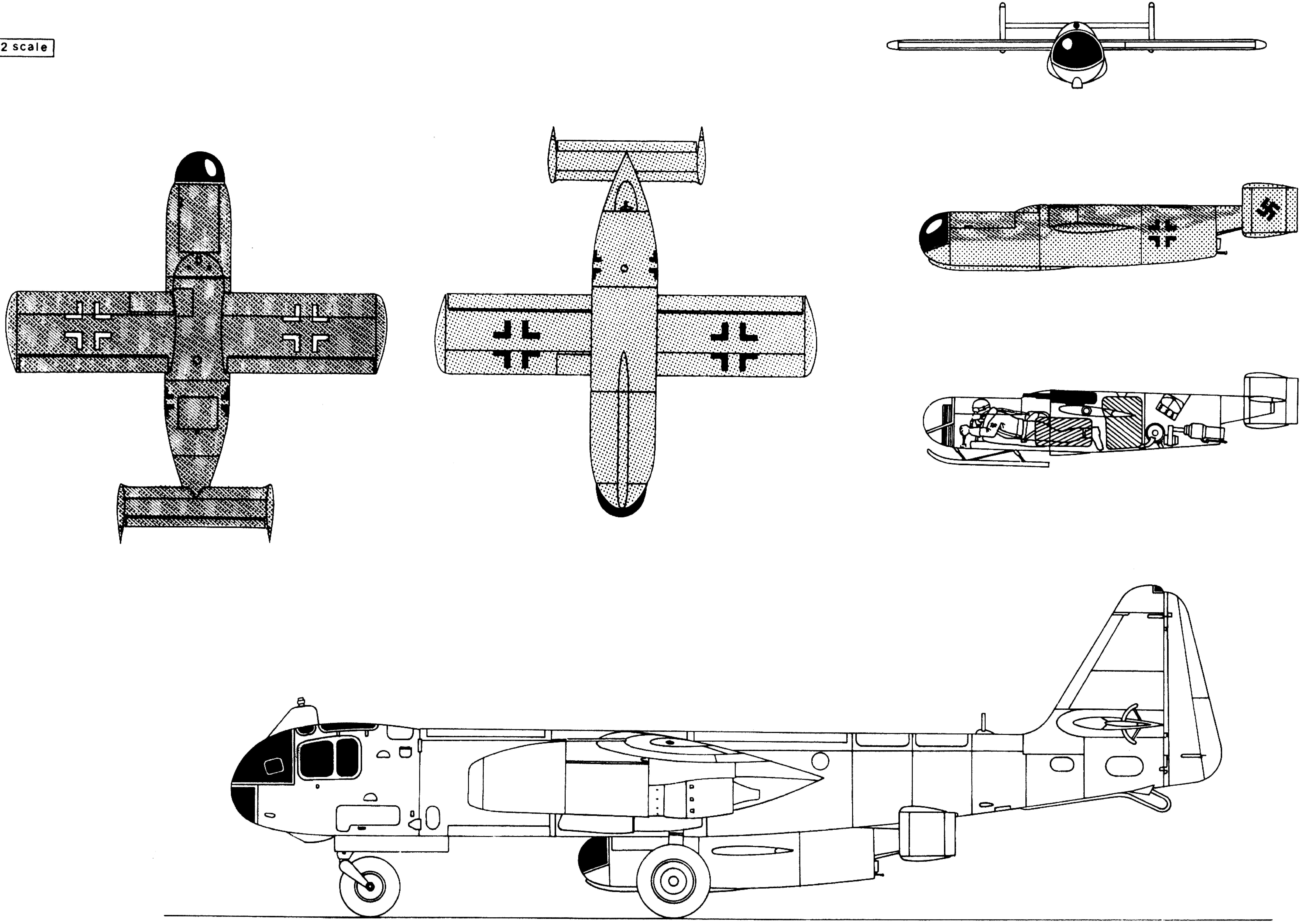
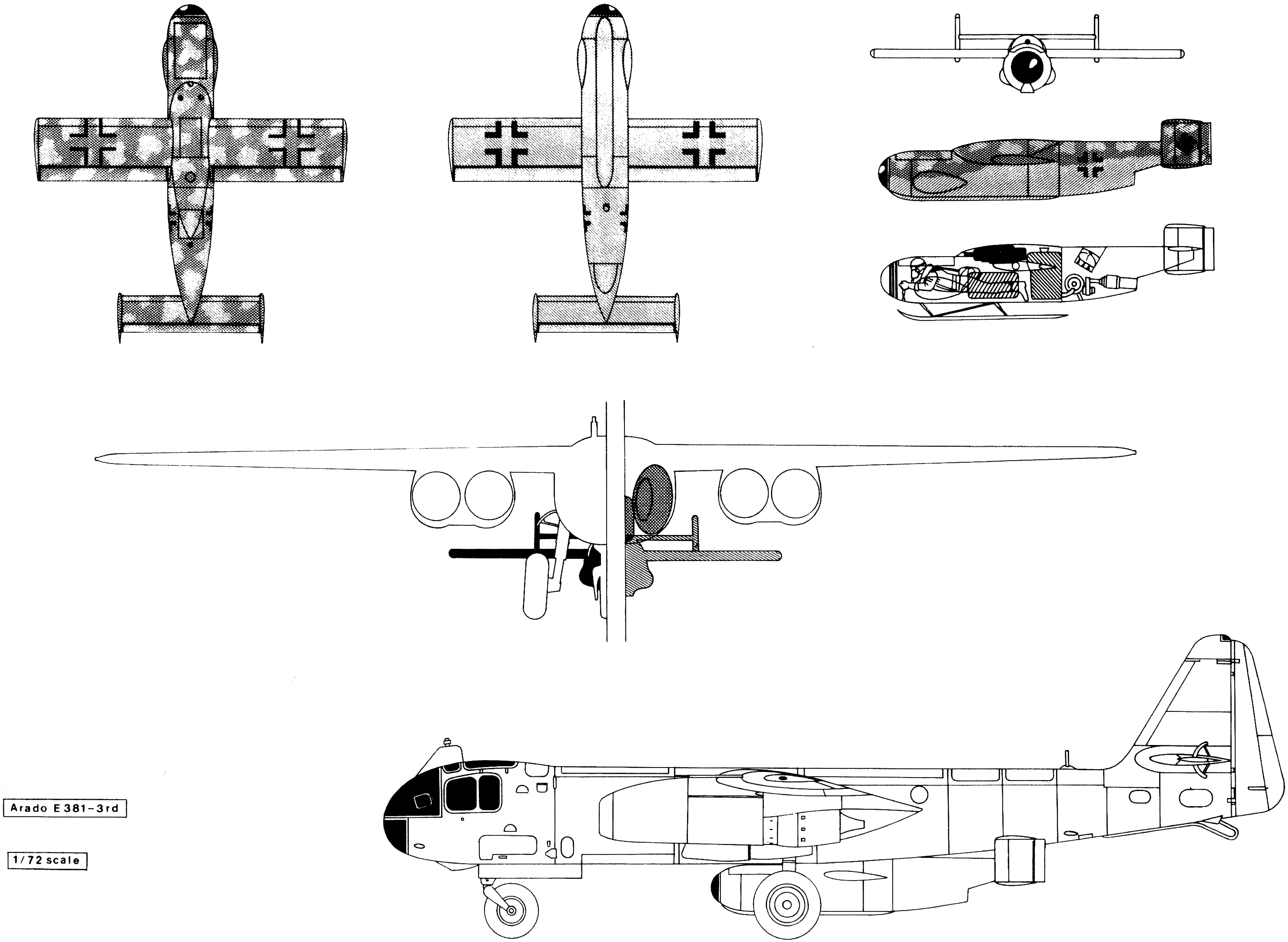


Arado E-381/I
1/72 scale

Arado E 381 - 2nd

1/72 scale





Arado E 381-3rd

1/72 scale

ARADO E-381 Series

Multitude of parasite fighters designs appeared in Germany by the end of 1944. They were very small airplanes of which big quantities could be manufactured just using wood and steel, both non-strategic materials- and that were either to be launched from or towed by bigger airplanes.

The advantage of the system lied in the fact that, not having to take-off and reach the interception area by their own means, the amount of fuel they have to transport was minimum or nothing at all. Some were gliders and others were propelled by rockets, but all of them were heavily armoured and had the smallest frontal section. The lattest being of great help for them to successfully face the hundreds of heavy machine guns of the Boxes of B-17 bombers in the deathly area of 1000 yards, within which the conventional fighter suffered abundant casualties.

Within this context, the Arado company launched its own designs of parasite fighters of the E.381 series. They were tiny airplanes propelled by a Walter rocket, armed with an Mk 108/30 and with the pilot in a prone position within an armoured cylinder and with bullet-proof windshield 145 mm thick.
It reached the combat area suspended under the belly of an Ar 234 of the C-3 series and landed by gliding with the help of a braking parachute, like the Me P 1103/I.
The carrier airplane supplied the telephonic link, the heating, the electricity and the hot air. Three versions are known:

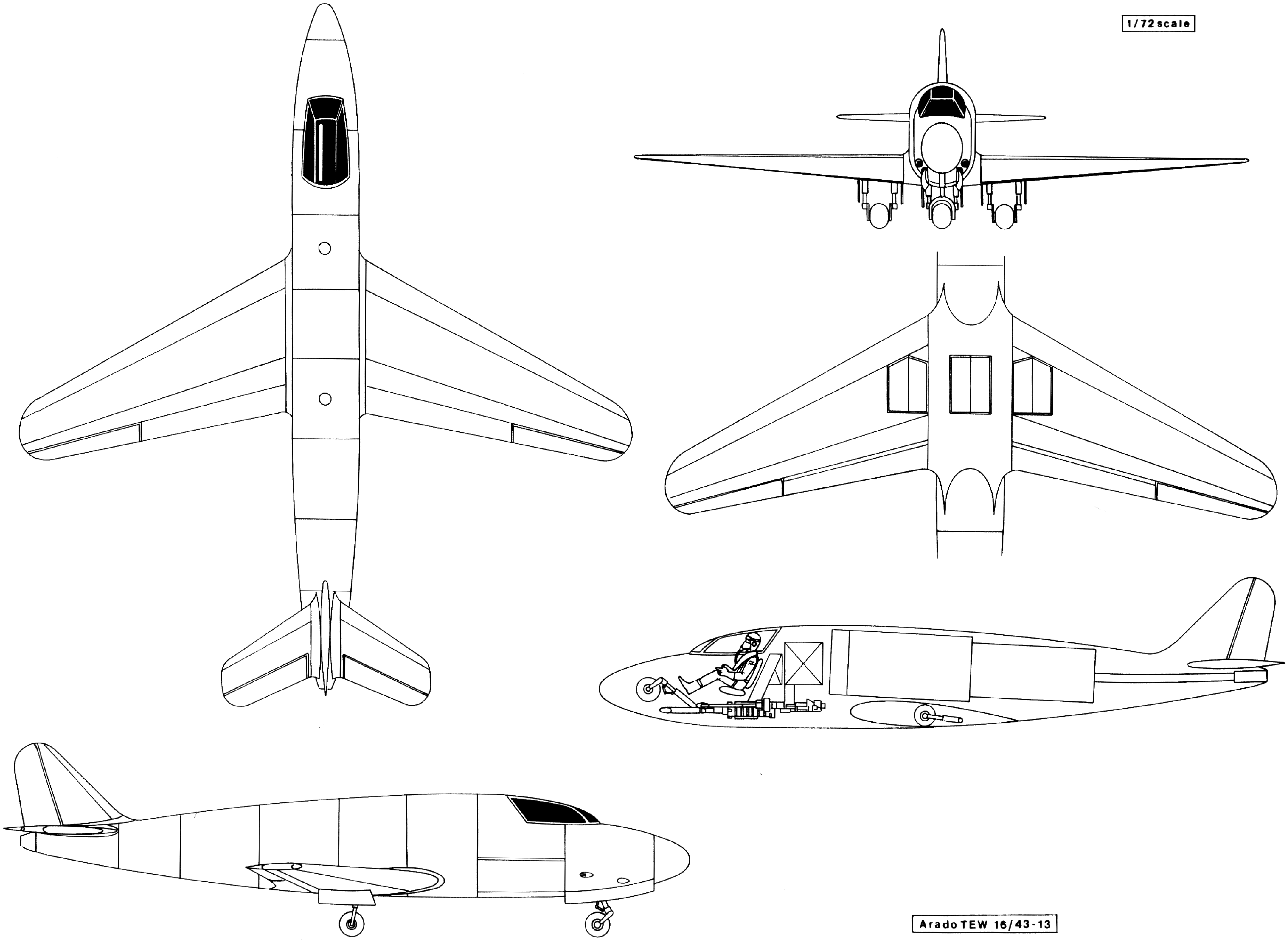
Arado E 381/I Fuselage of triangular section with lateral hatch, skids in the wingtips and six RZ65 rocket launchers in the wings leading edge.

Arado E 382/II Fuselage of cylindrical section, shorter and with the hatch on the top. Wings and tail surfaces were also shorter and of a bigger chord. An Mk 108/30 gun.

Arado E 381/III Circular fuselage with the diameter reduced to its minimum (650 mm) with lateral bulks for the pilot elbows, the only protruding area in a prone position.

TECHNICAL DATA E 381/I, (II), ((III))

Type	Interceptor rocket
Phase	Mock-up
Structure and cladding	Steel and steel plate with an armour of 6 to 27 mm around the pilot
Landing gear	retractable skid with shock absorbers
Engines	A Walter 109-509 B rocket engine of liquid fuel with a thrust of 900 kg
Fuel tanks	One of 149 lt. of T-stoff and two of 38 lt. of C-Stoff each, in the fuselage
Armament	Six RZ 65 unguided rockets within the wings or a rocket launcher Wgr 21 of 210 mm (an Mk 108/30 of 30 mm with 45 cartridges) ((an Mk 108/30 of 30 mm with 60 cartridges))
Wingspan	5.05 m (4.89 m) ((4.43m))
Length	5.54 m (4.84 m) ((4.69 m))
Height	1.51 m (1.15 m) ((1.29 m))
Maximum weight	1,500 kg (1,200 kg) ((1,265 kg))
Maximum speed	880 km/h (900 km/h) ((900 km/h))



Arado TEW 16/43-13

Arado TEW 16/43-13

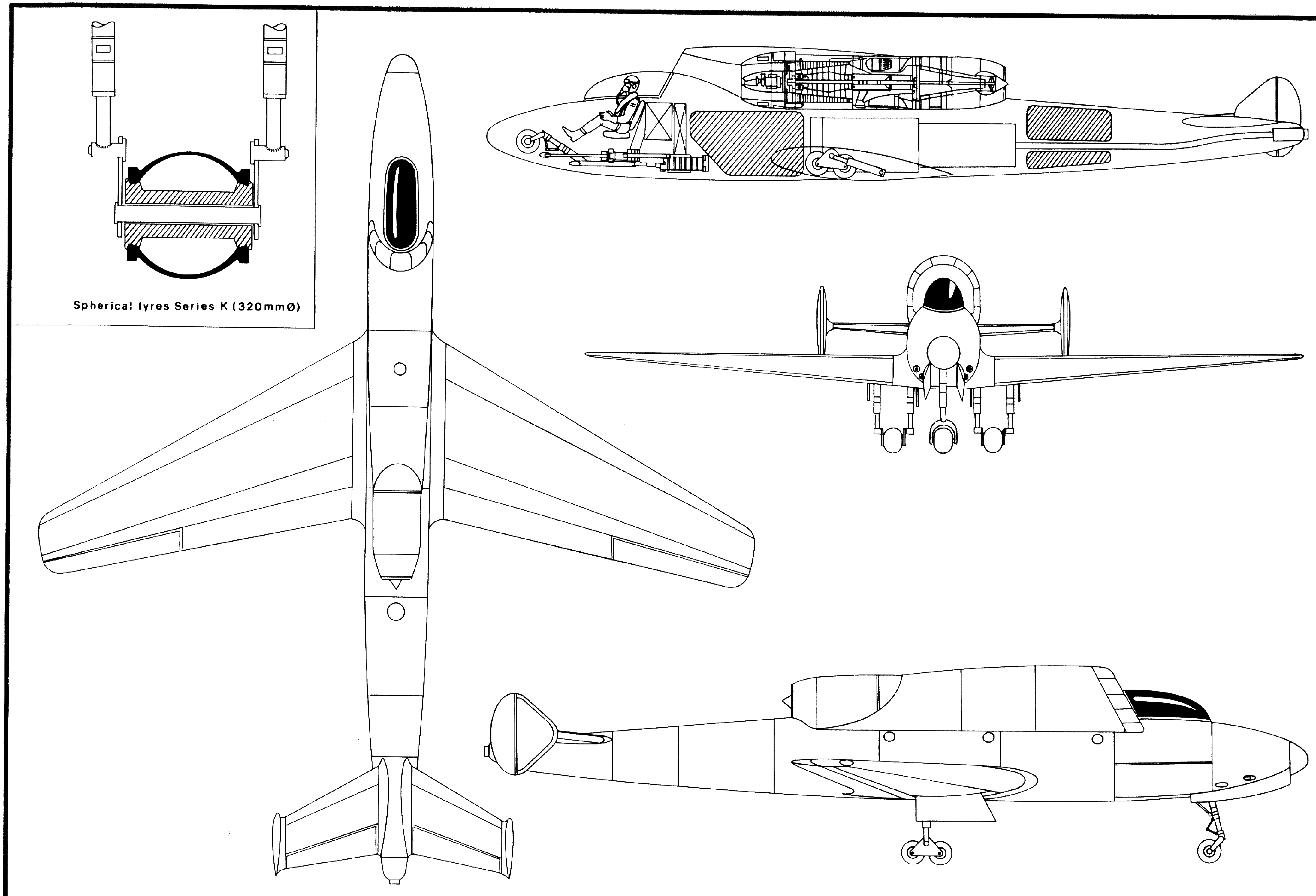
Interceptor project of high performances using a rocket engine propelled by liquid fuel.

Compared to the Me 162 "Komet", it may be considered as a more advantageous design from the pilot point of view as it was better armed and had a very reliable landing gear. Its range was also superior, although most of the technical data are unknown.

The aerodynamic research served as base for other projects of the 16/43 series. The no. 15 was a fighter of mixed propulsion, the no. 19 a heavy night fighter and the no. 23 a jet interceptor of high performances in the line of the Me 262.
The spherical tyres were a DVL patent of 1940 and meant a great advance compared to the conventional ones for its small size and weight, ideals for a rocket engine.

TECHNICAL DATA

Type	Rocket interceptor
Phase	Design
Structure and cladding	Metallic
Landing gear	With spherical DVL tyres, three main wheels and one at the nose
Engines	A walter HWK 109-509 A with 1,700 kg of thrust
Fuel tanks	Two, of T-Stoff and C-Stoff in the fuselage with a combined capacity for 1,850 kg of propellants
Armament	Two MG 151/20 of 20 mm and two Mk 108/30 of 30 mm in the forward area of the fuselage
Wingspan	8.85 m
Length	9.70 m
Height	2 m
Wing area	14 m^2
Maximum weight	4,620 Kg



Spherical tyres Series K (320mmØ)

1/72 scale

Arado TEW 16/43-15

Arado TEW 16/43-15

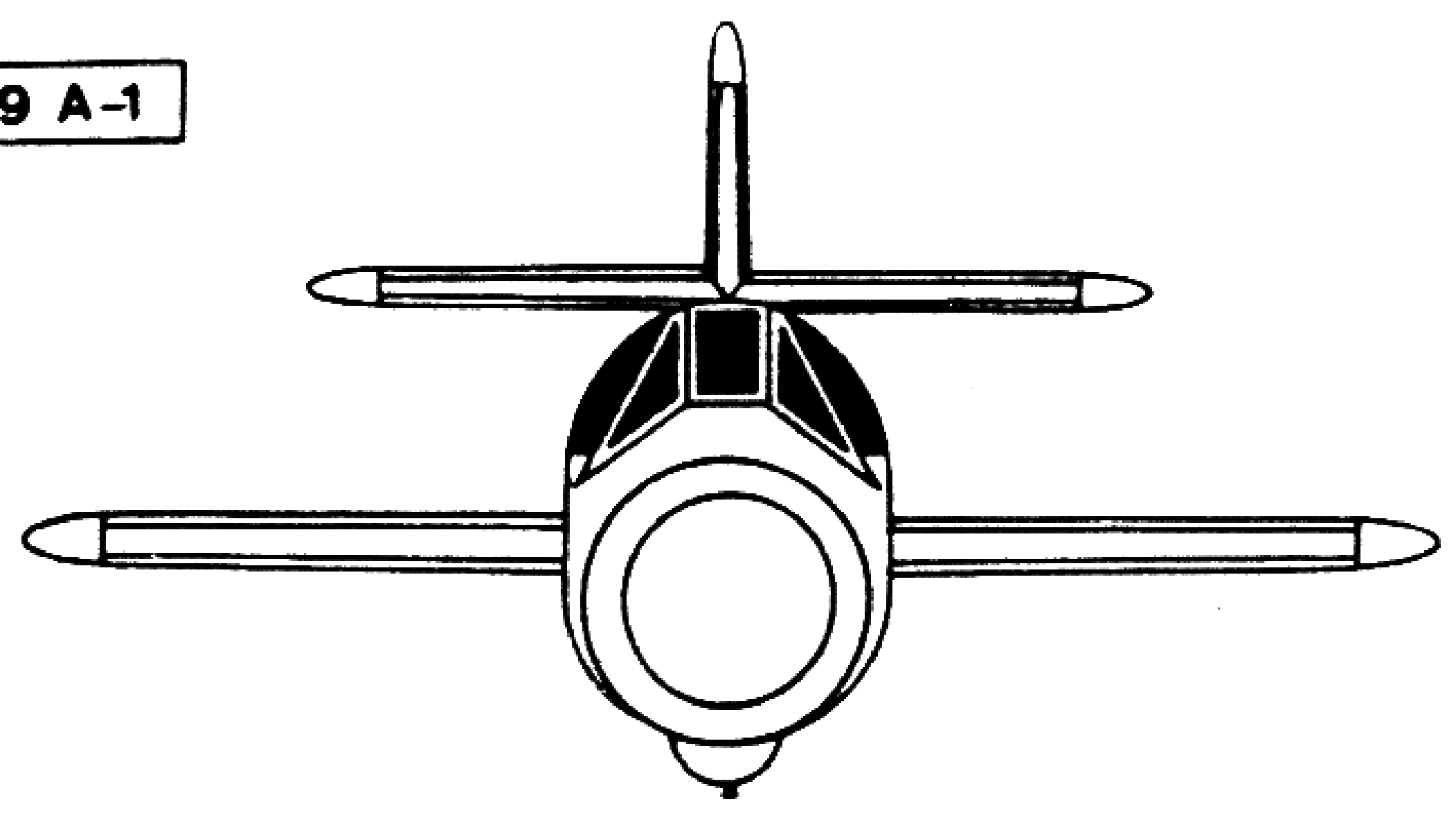
Mixed propulsion interceptor based on the rocket fighter TEW 16/43-13 to which an HeS 011 turbojet with 1,300 kg of thrust in dorsal position was added, to increase the range.
The armament, forward landing gear, wing shape -with a 25° sweep- and the position of the T-Stoff and C-Stoff tanks were the same.
The location of the turbojet forced the adoption of a twin fin configuration.
the landing gear lost the central leg and double spherical tyres were installed in tandem.
Two jet fuel tanks, ahead and behind the rocket propellants tanks, forced to increase the length of the fuselage in more than 2 m.

This project, of 20 March 1943, and its successor E.580, of 12 September 1944, were victims of the inefficient design of the jet intake always susceptible of stopping during flight at a high grade of A.O.A. due to insufficient feed of air.

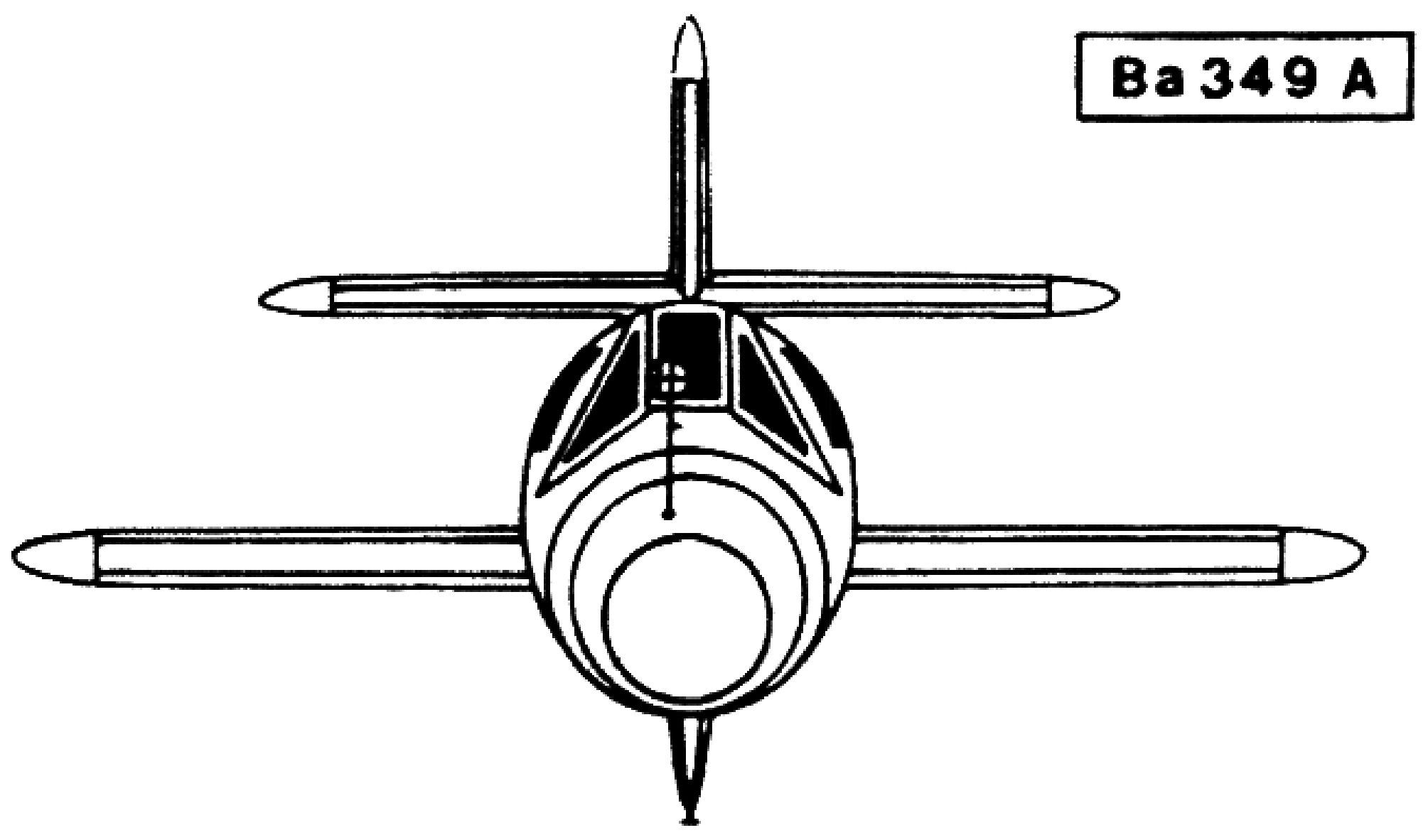
TECHNICAL DATA

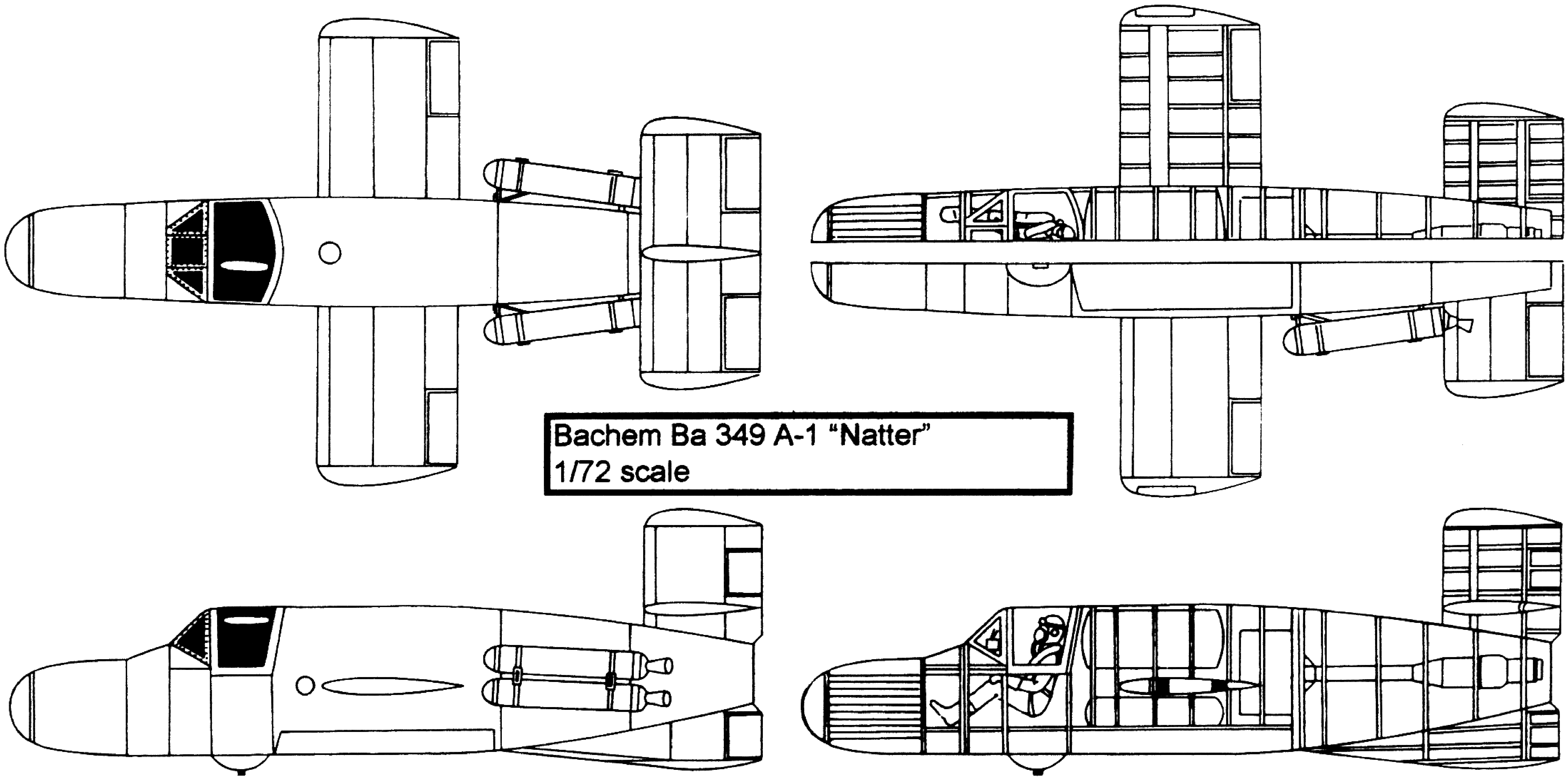
Type	Mixed power interceptor
Phase	Design
Structure and cladding	Metallic
Landing gear	Three wheeled with spherical DVL tyres
Engines	A Walter HWK 109-509A with a thrust of 1,700 kg and a HeS 011 turbojet with 1,300 kg of thrust
Fuel tanks	Two, in the fuselage, ahead and behind the propellants tanks
Propellant tanks	Two tanks, of T-Stoff and C-Stoff each, in the central area of the fuselage
Armament	Two MG 151/20 of 20 mm and two Mk 108/30 of 30 mm in the forward area of the fuselage
Wingspan	10.3 m
Length	11.75 m
Height	2.8
Wing area	19 m^2
Maximum weight	6,670 kg
Maximum speed	920 km/h (with two engines)
Ceiling	18,800 m (with two engines)

Ba 349 A-1

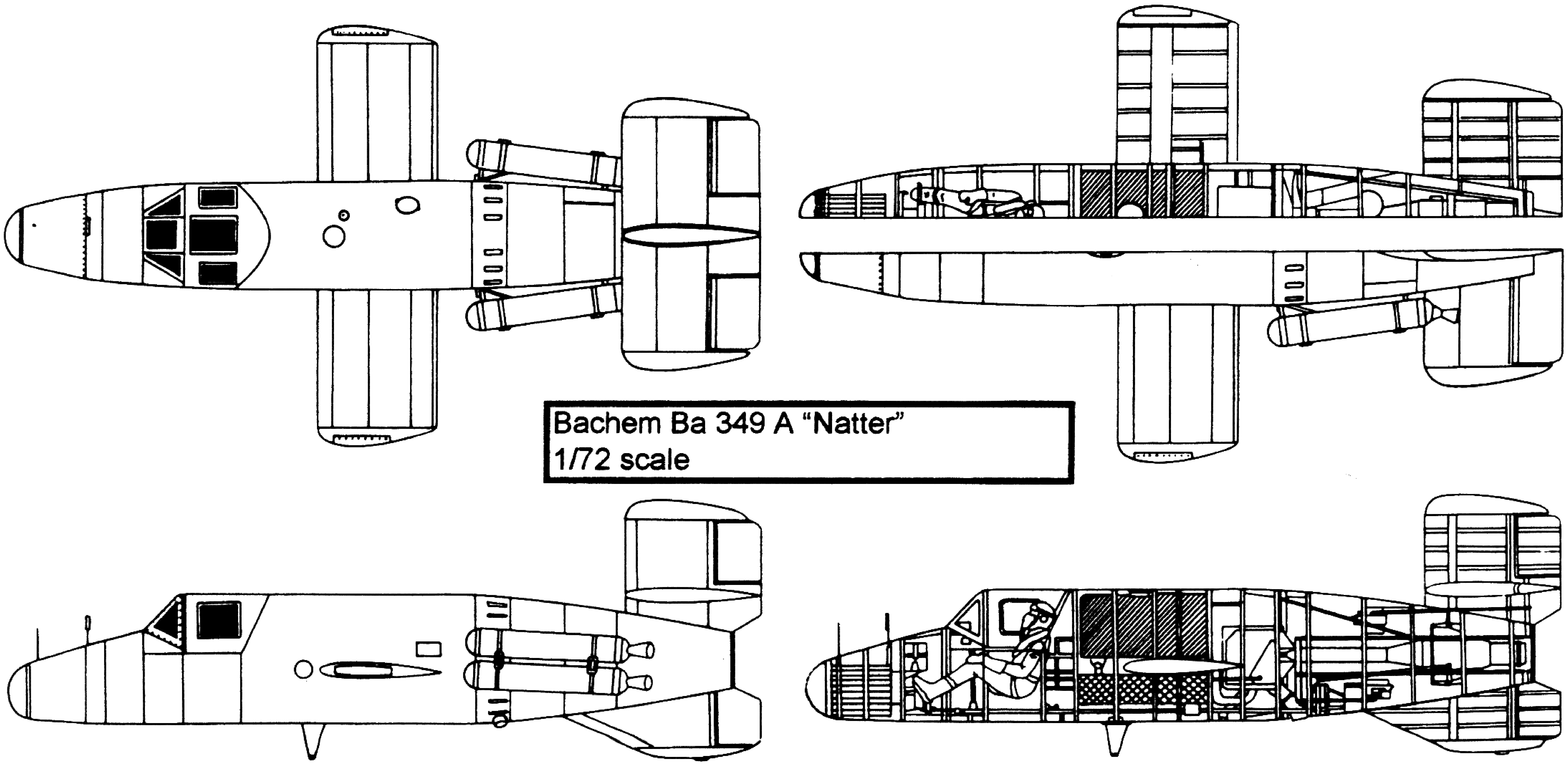


Ba 349 A

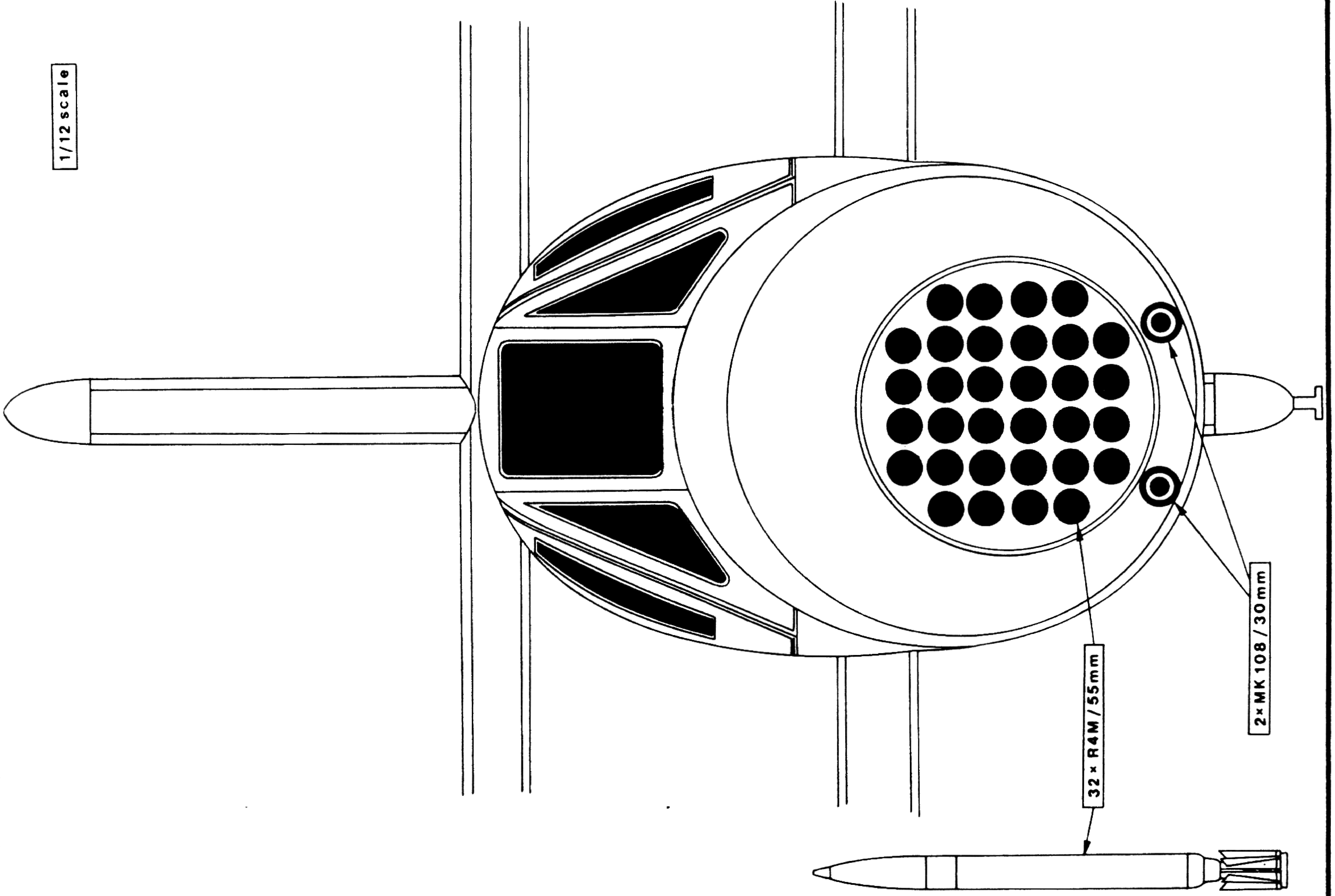


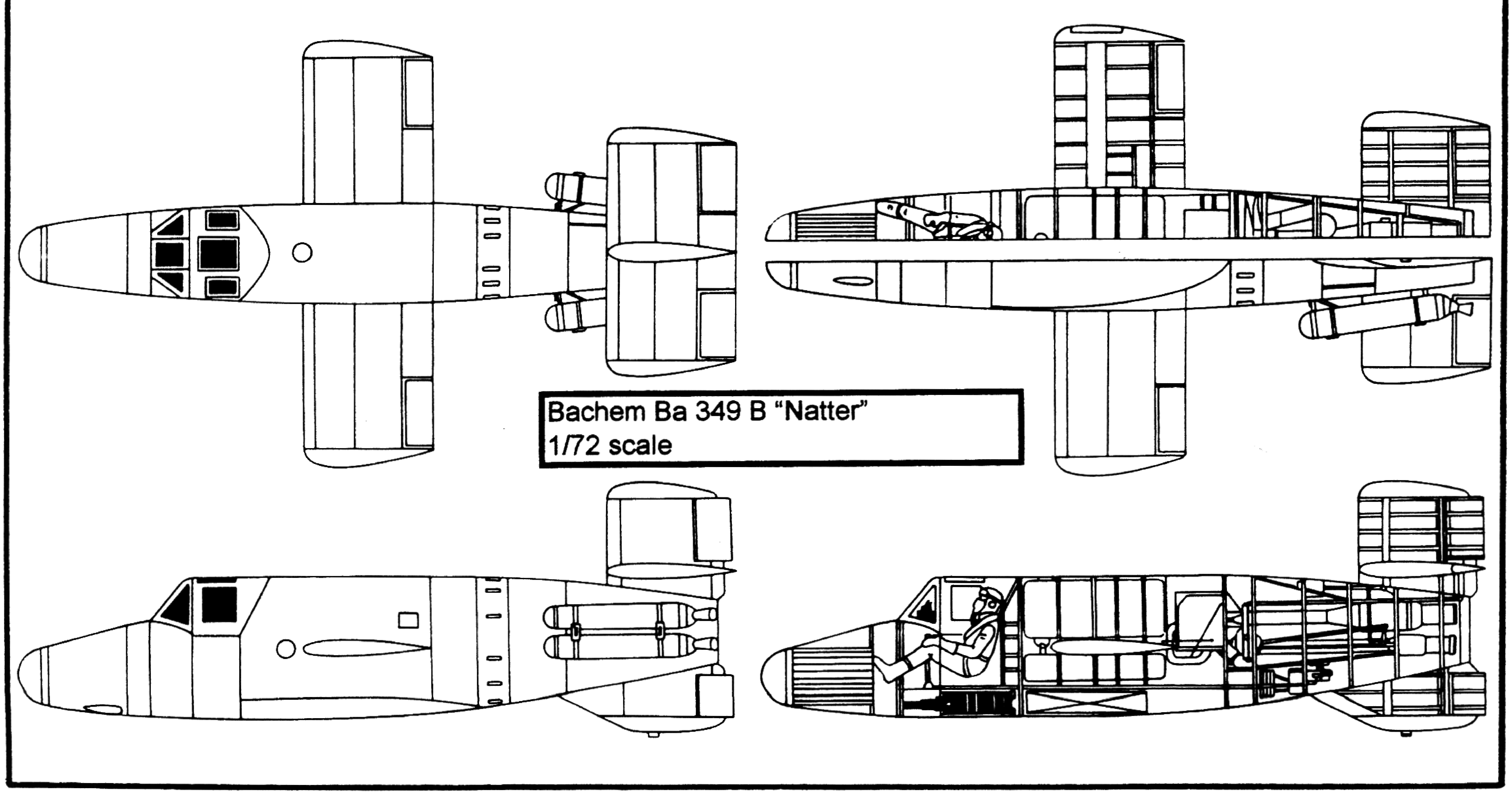


Bachem Ba 349 A-1 “Natter”
1/72 scale



Bachem Ba 349 A “Natter”
1/72 scale





Bachem Ba 349 B "Natter"
1/72 scale

BACHEM BA 349 "Natter"

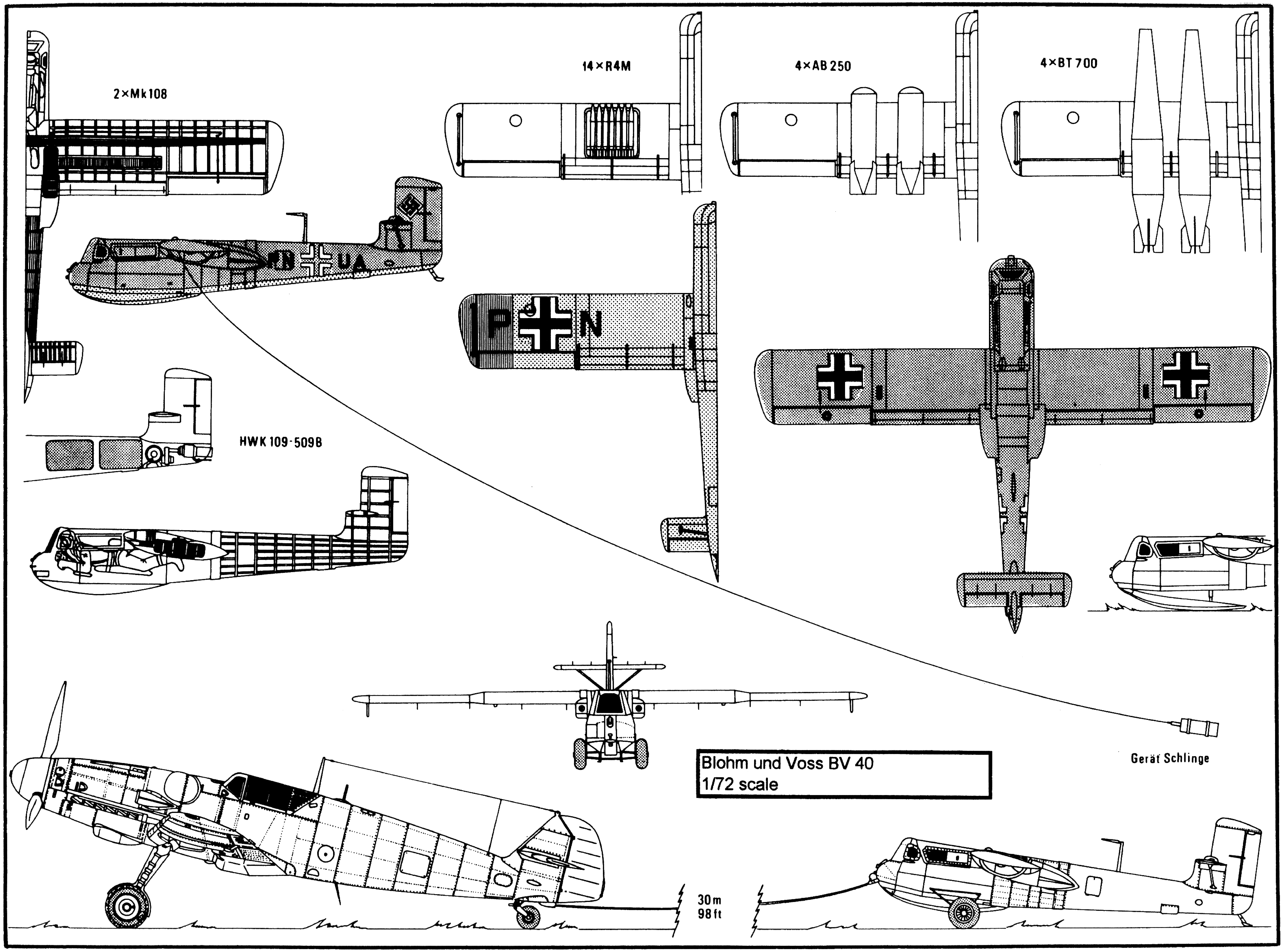
Target defence rocket interceptor designed to be built with non-strategic materials. It could operate without using any landing strip.
It took off vertically from a ramp helped by four Schmidding rockets. It attacked the formation of enemy bombers with guns or air-to-air rockets and glided down once the fuel was gone (like the Me-163) but, instead of a conventional landing, the pilot and the airplane came down separately using both their own parachutes.

The first flight was on 1 March 1945, although the end of the war prevented it from real combat.

The plan was to build three versions -A, A-1 and B- that mainly differed in their engines and installed armament.

TECHNICAL DATA A (A-1) ((B))

Type	Target defence rocket interceptor
Phase	Flight tests (construction) ((design))
Wings	Wood structure and cladding.
Fuselage	Wood structure and cladding
Landing gear	None
Engine	A Walter HWK 109-509 A-2 rocket of liquid fuel, with a thrust of 1,700 kg plus four Schmidding 109-533 rockets of solid fuel with 1,000 kg of thrust each (A Walter HWK 109-509 A-2 rocket of liquid fuel, with a thrust of 1,700 kg plus four Schmidding 109-533 rockets of solid fuel with 1,000 kg of thrust each) ((A Walter HWK 109-509 C-1 rocket of liquid fuel with a double combustion chamber and 2,000 kg of thrust, plus four Schmidding 109-533 rockets))
Armament	A "Grosse Rohrbatterie" of 30 mm with 32 barrels (24 Hs 217 "Föhn" unguided rockets) ((32 R4/M "Orkan" unguided rockets plus two Mk 108/30 guns of 30 mm))
Fuel Tanks	One of T-Stoff of 365 lt. and another of C-Stoff of 165 lt. in the fuselage (One of T-Stoff of 365 lt. and another of C-Stoff of 165 lt. in the fuselage) ((One of T-Stoff of 400 lt. and another of C-Stoff of 190 lt. in the fuselage))
Wingspan	3.6 m (4 m) ((4 m))
Length	6.4 m (6.4 m) ((6.6))
Height	2.2 m (2.2 m) ((2.37))
Wing area	3,6 m^2 (4.7 m^2) ((4.7 m^2))
Maximum weight	2,050 Kg (2,150) ((2,270))
Maximum speed	1,000 km/h (1,000 km/h) ((1,000 km/h))
Ceiling	16,000 m (16,000 m) ((16,000 m))
Range	45 km (70 km) ((81 km))



Blohm und Voss BV 40
1/72 scale

BLOHM UND VOSS BV40

A small armored glider built with a minimum frontal section to penetrate in the 1,000 yards area covered by the heavy machine guns of American bomber formations.

Designed by doctor Richard Vogt to be built by non-qualified personnel using non-strategic materials, it was proposed to the RLM in the middle of 1943.

Production plans included 19 prototypes and 200 airplanes of series BV 40A, but when the project was abandoned in Autumn 1944, only six machines had been manufactured. Use of the BV 40 required the help of a towing airplane (Bf 109G) to take off from a detachable trolley and be towed to the combat area at 6,000 m altitude.

Once released, the tiny fighter made its first attack diving against the "boxes" at a 20 degree angle, ignoring the defensive fire and firing its two 30 mm guns from a very short distance. When in favorable circumstances, the accumulated kinetic energy allowed a second attack, using either the guns or the "Gerät-Schlinge" device. The latter consisted of a towed explosive charge which gave the BV 40 the status of a piloted missile. After combat, the plane glided to a suitable landing site using flaps and a ventral skid.

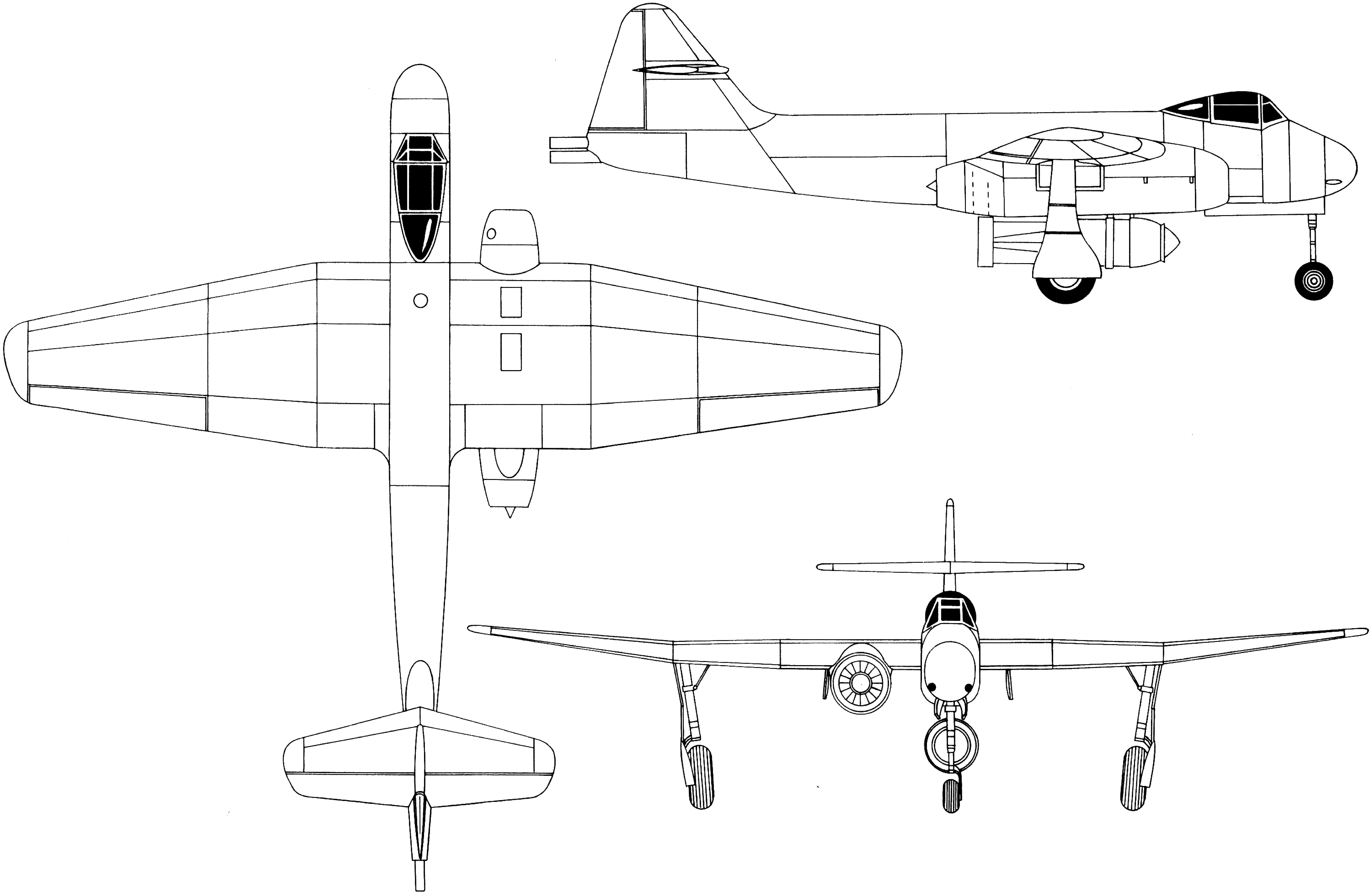
Different modifications were foreseen. It was proposed to use the air to air R4M rockets carried under wings in groups of 7 units. Also, the air to air bombing of "boxes" using four containers of type AB 250 for small charges with proximity fuses. It was also proposed as an anti-ship version fitted with four aerodynamic BT 700 torpedoes. However, the great weight of the plane prohibited the launch from a plane for the last two functions.

The RLM emphasized the BV 40's vulnerability against Allied escort fighters and, trying to save the project, manufacturers proposed motorized variants equipped with two pulsejets Argus As 014 located under the wings, or with a solid propellant rocket HWK 109-509 B, but could not compete with the Me 328 and Me 163 assigned to the same function. The last proposal to use it as a towed fuel tank failed against project Fieseler Fi 103 SG 5041.

Flight tests were made with prototypes V1, V2, V4, V5, and V6 in Wenzerdorf, towed by a Messerschmitt Bf 110.

BV40 (Technical data)

Type	Glider fighter
Stage	Flight tests
Wings	Wood structure and coating with flaps
Fuselage	Wood structure and coating. Armored steel plate of 20 mm (nose), 8 mm (back), and 5 mm (belly) screwed together from the outside. Armored windshield of 120 mm
Tail unit	Wood structure and coating. Brace elevator
Undercarriage	retractable skid
Powerplant	None in the originally projected BV 40A
Weapons	Two guns Mk 108 of 30 mm, or an Mk 108 and a towed mine
Wingspan	7.90 m (25 ft. 11 in.)
Length	5.70 m (18 ft. 8 2/5 in.)
Height	1.63 m (5 ft. 4 1/8 in.)
Launch weight	950 kg (2,097 lb.)
Diving maximum speed	1,037 km/h (560 MPH)



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Blohm & Voss P.178

BLOHM UND VOSS P.178

Dive bomber of asymmetric design which solved most part of the problems related to the air intakes and lenght of fuselage, associated with the first single engine jets.

The P.178 had two auxiliary rocket engines at the tail to a purpose we cannot explain. However, it is quiet obvious that they were used to help the loss of power of the Jumo 004 turbine engine at takeoff when the plane was heavily loaded. They might also be very useful to avoid the fighters by a brief and violent acceleration. The author David Masters believes that they were used to recover speed when started climbing after a diving. It was planned to use a similar device in the Lippisch bombers P.11

The armament were two MG 151 and it was enough for autodefense without hindering the plante stability or manoeuvrability.

Neither this plane nor its competitor the Henschel Hs 132 received the necessary priority to go into production.

TECHNICAL DATA

Phase	Project
Structure	Metallic
Engine	A Jumo 004 B turbojet of 890 kp in starboard asymetric position. Also, two rocket engines of solid fuel at the tail
Fuel Tanks	In the fuselage, behind the pilot
Fixed armament	Two MG 151 machine guns of 15 mm in the nose
Launch armament	Up to 1,000 kg of bombs

Measures, weights and performances

Wingspan	12 m
Length	10.8 m
Height	4.10 m

Von Braun Interceptor (Stage I)

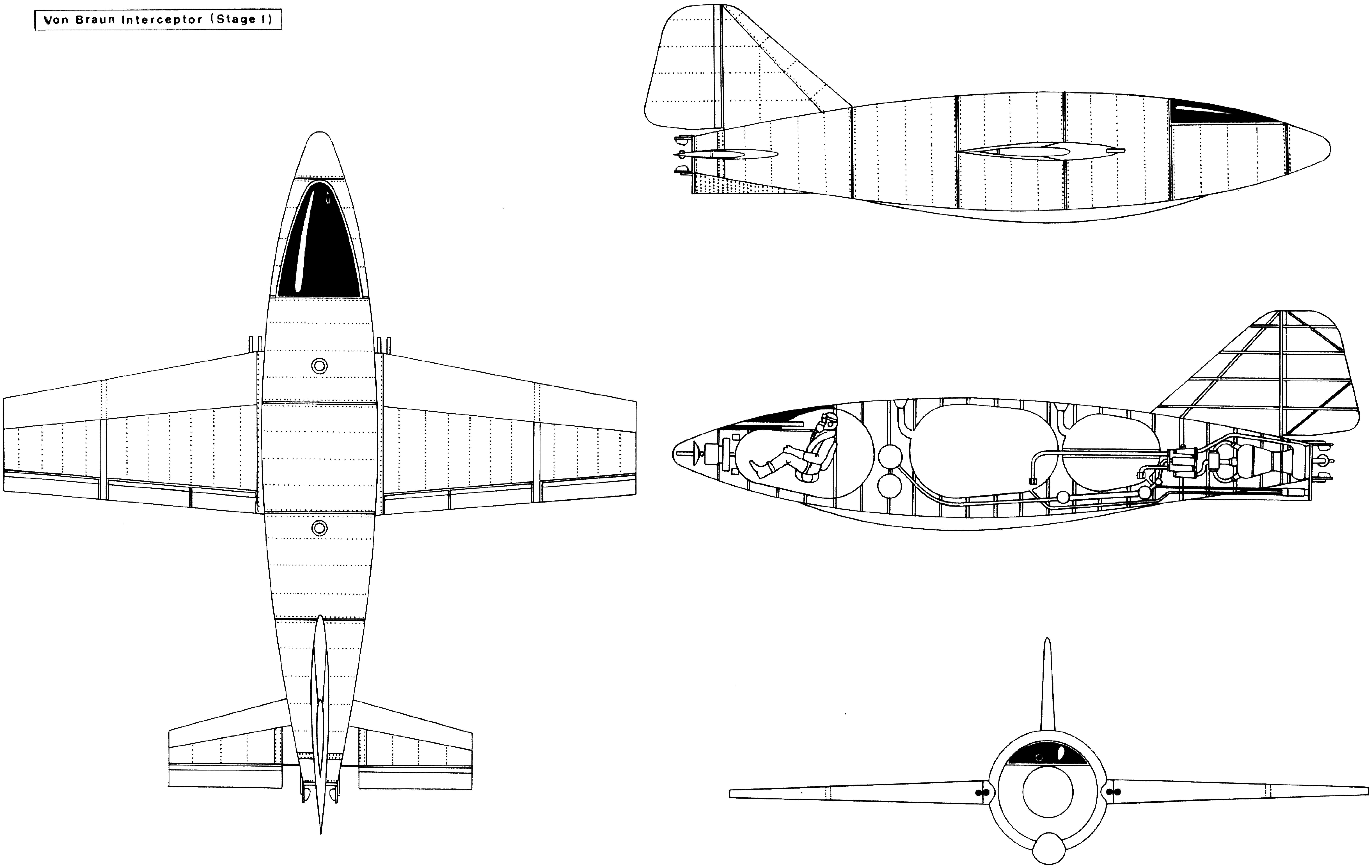

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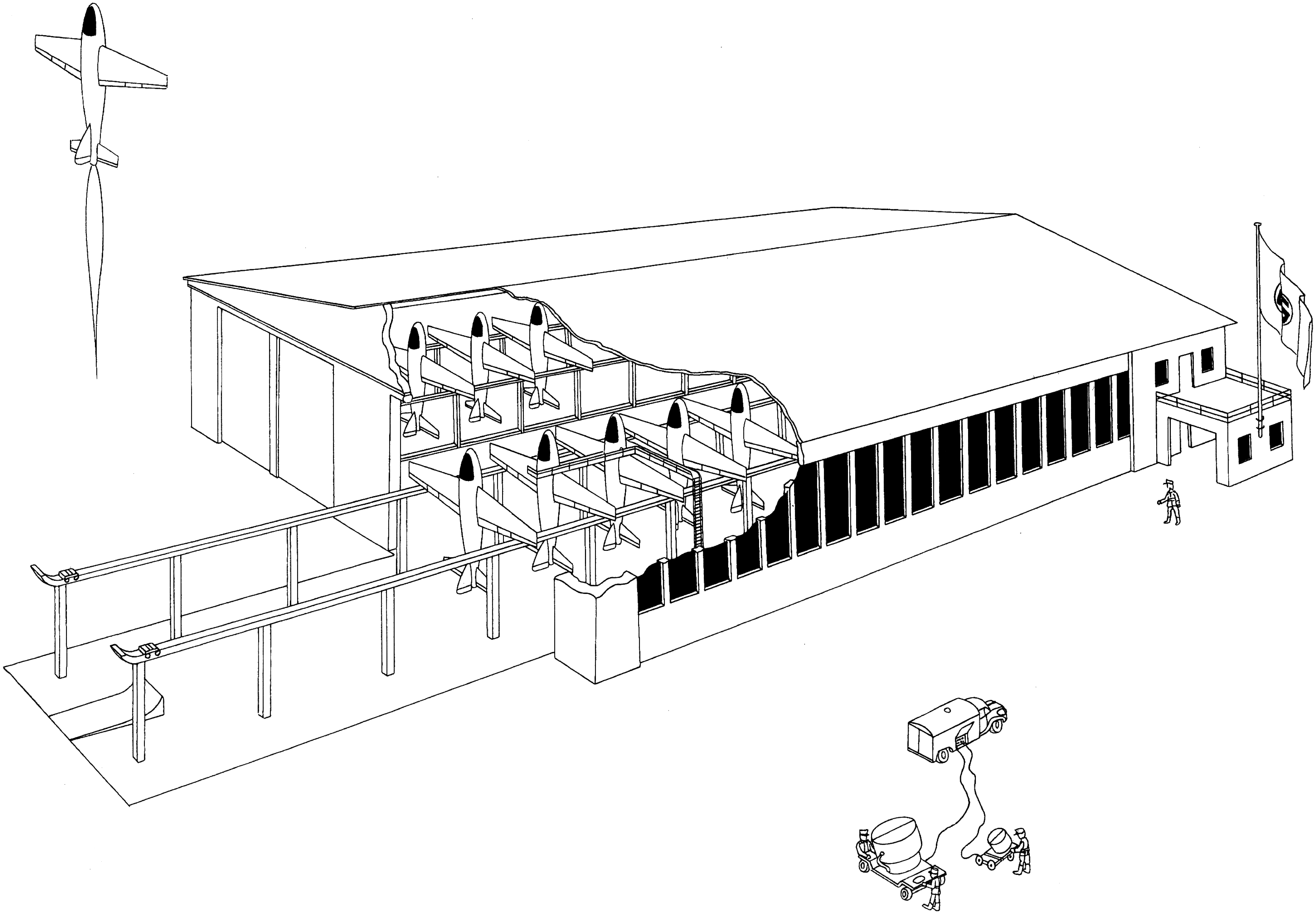
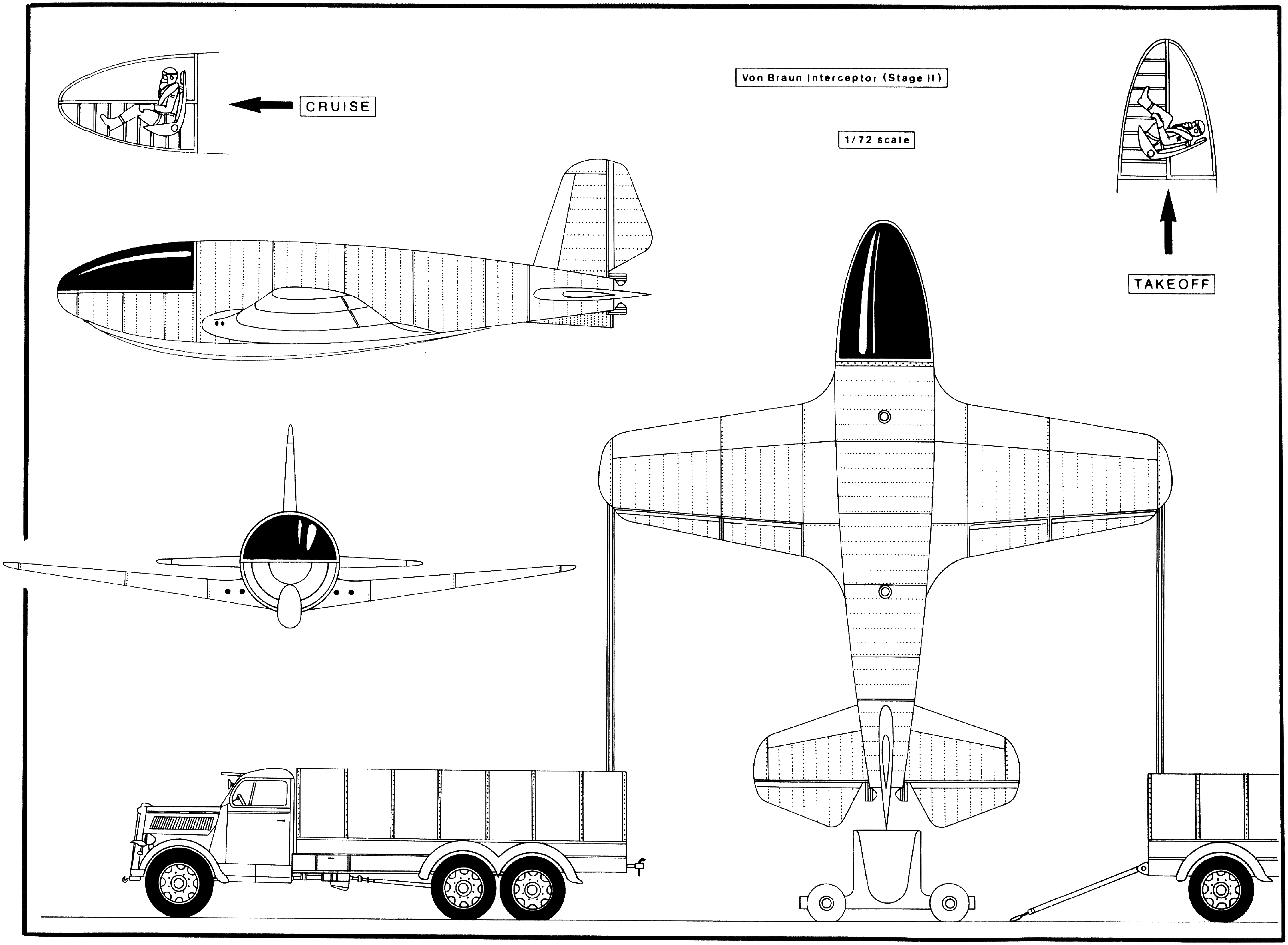
Abbildung und Startenordnung für Rückstoßjäger




Von Braun Interceptor (Stage II)

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Von Braun Interceptor

Besides cooperating with the Army, Wernher von Braun was interested in the application of rocket power to conventional airplanes to improve their performances. On 6 July 1939, he presented a project of vertical takeoff rocket interceptor to the Reichs Luftfahrt Ministerium (RLM) based on the technology acquired with the A3.

The aircraft was stored in a hangar in a vertical position hanging from two rails separated 6 Mts. from each other. A wheeling system, with an electric remote control, was used to take it out of the hangar and position it for launch over a blast deflector. Once the target was found by means of land based radar of the FuMG 39T "Würzburg A" type, the flight control centre worked out the optimum interception trajectory and launched the aircraft by remote control.

During the climbing path, the gyro control unit automatically stabilised the device during the first 53 seconds, using the exhaust nozzle vanes. The pilot took manual control when reaching 8,000 metres changing the propulsion to the auxiliary combustion chamber (less powerful but also consuming less propellant) and performing a classic interception at 700 km/h. It was foreseen to fit some type of .telescopic sight (most probably a predecessor of the infra-red detectors "Spanner" of 1941).

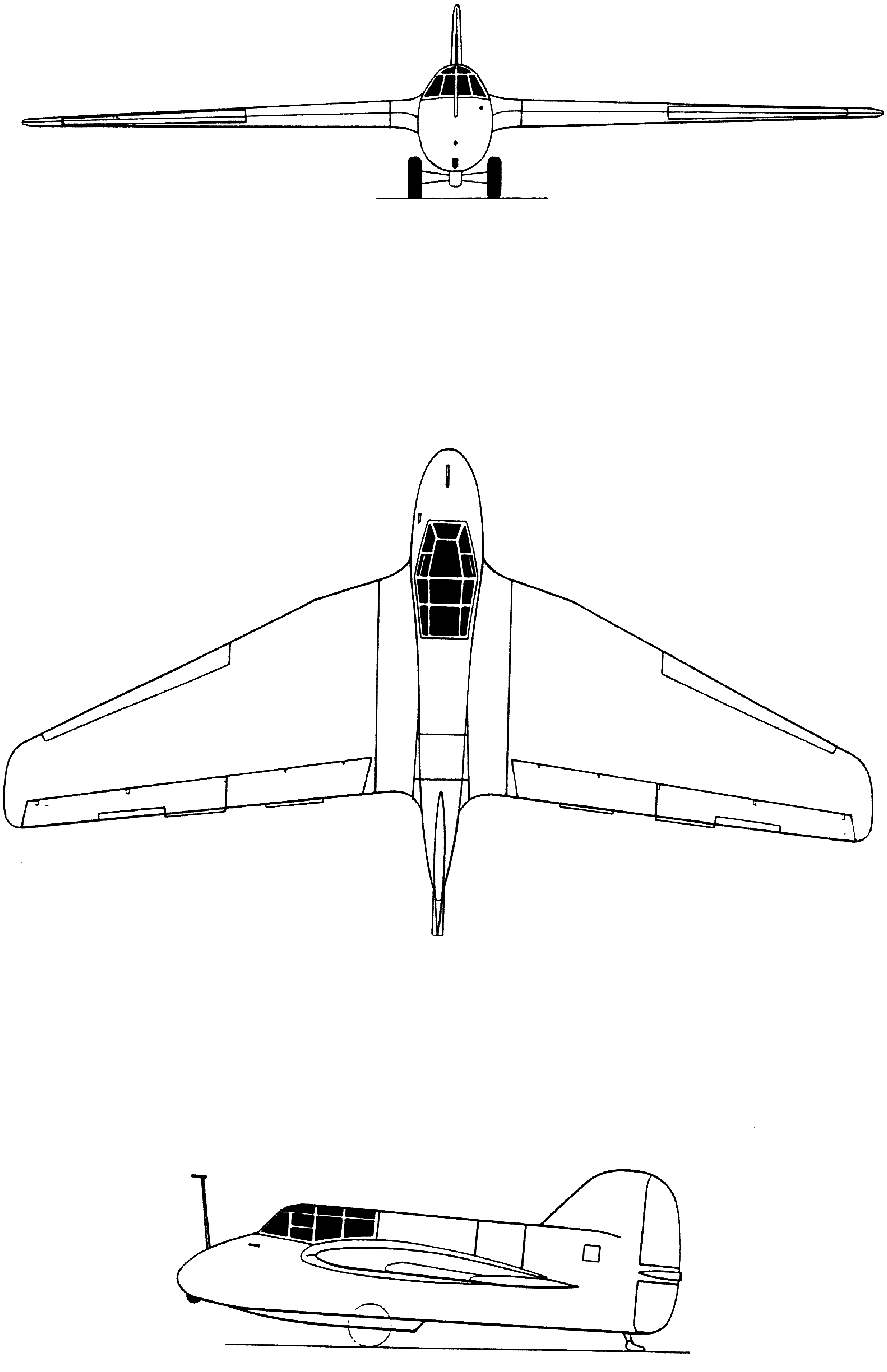
The pilot was positioned in a pressurised cockpit with double windscreen. The airplane glided back to the base landing over a retractable skid, likewise the Me 163.

It was a very advanced concept for the time and the RLM considered that to carry out such an exotic project was unfeasible. One of the reasons given was the difficulty to store, handle and transport the cryogenic propellants, preferring the development of the Walter HWK R I-203 rocket engine (less powerful although safer). This engine worked with non-cryogenic propellants, cheaper than the liquid oxygen and easier to obtain by the chemists of the time.

After this decision, Wernher von Braun had to reconsider his offer, presenting to the RLM (on 25 May 1941) an improved version of the original interceptor, based on the technology of the A8 missile. It was powered by a rocket with two combustion chambers which worked with a mixture of Visol and SV-Stoff, both of them easy to store at a standard temperature. It could be launched from the same truck used to transport it.

TECHNICAL DATA Phase I (Phase II between brackets)

Phase	Project
Structure	Metallic
Engine	A rocket of liquid propellant based on the A3 (A8) missile with two combustion chambers. It was expected to obtain a thrust of 10,000 kg (10,160 kg) at vertical flight and 725 kg (770 kg) at cruiser flight with the first one.
Propellant tanks	Three (four) in the fuselage. One of A-Stoff, another of M-Stoff and a third one of pressurised nitrogen (one of SV-Stoff, one of VISOL, one of T-Stoff and a fourth one of Z-Stoff)
Guidance system	Gyroscopic stabilisers, during vertical flight, with nozzle vanes acting over the main nozzle
Armament	Four machine guns installed in pairs at the wing roots.
Dimensions, weights and performances	
Wingspan	8.5 m (8.6 m)
Length	9.3 m. (9.3 m.)
Height	3.02 m. (3.2 m.)
Weight loaded	5,000 kg (5,080 kg.)
Cruising speed	700 km/h (690 km/h)
Range	15 min. (15 min.)
Ceiling	8,000 m. (8,000 m.)



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DFS 194

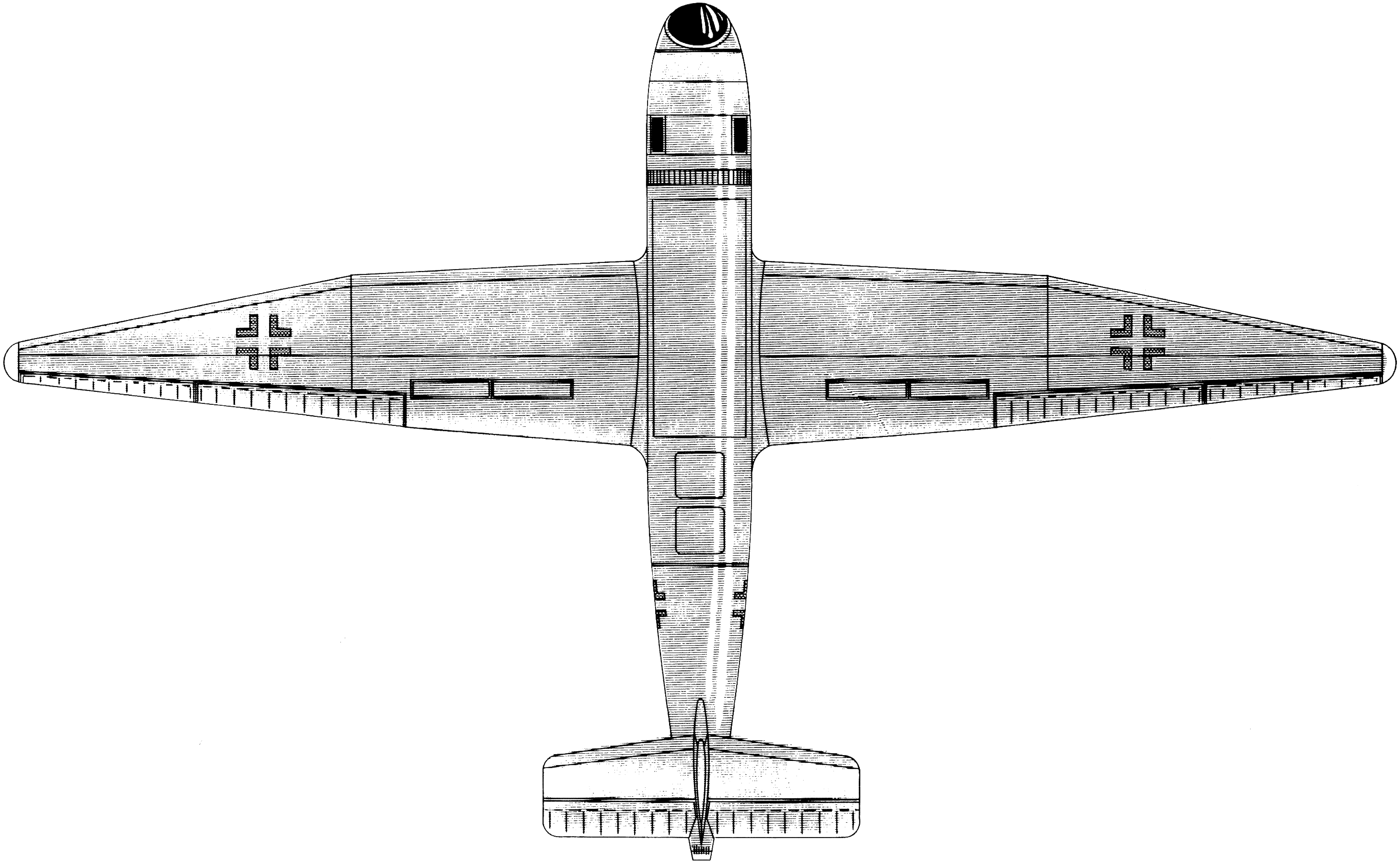
DFS 194

Designed by Alexander Lippisch for the Deutches Forschungsintitut für Segelflug starting from the "Delta IVd" glider. The project, known as "Projekt X" of 1938 had two variants, the glider with a tailfin and another without tailfin propelled by an Argus piston engine and with the wingtips folded downwards to improve stability.
Both versions were merged in the DFS 194 that had tailfin, straight wingtips and a Walter bifuel rocket engine.

The flight tests performed in Augsburg-Haunstetten during the Spring of 1940 offered satisfactory results and led to the manufacturing of the Me 163 based on the same principles.

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Flying test
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	Detachable trolley plus landing skid
Engine	One Walter HWK RI-203 bifuel rocket with 400 kp static thrust
Fuel tanks	One of T-Stoff and four of Z-Stoff in the fuselage
Armament	None
Wingspan	9.3m
Length	5.38 m.
Height	1.94 m.
Wing area	17.52 m^2
Maximum weight	2,100 kg
Maximum speed	550 km/h
Range	160 seconds of powered flight



DFS 228

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DFS 228

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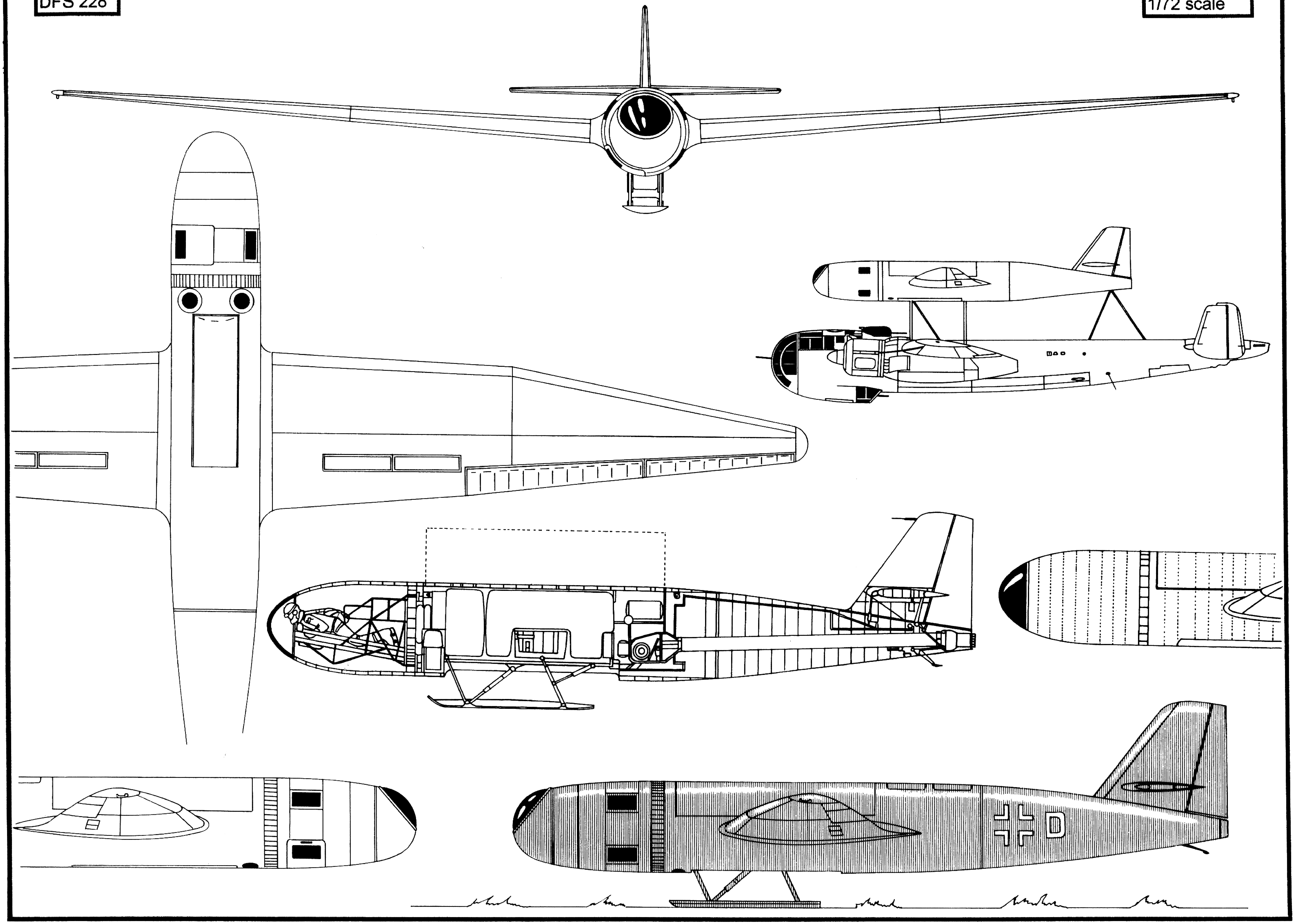


DFS 228

Stratospheric reconnaissance airplane developed in 1943 for the DFS in competition with the Arado 234 R

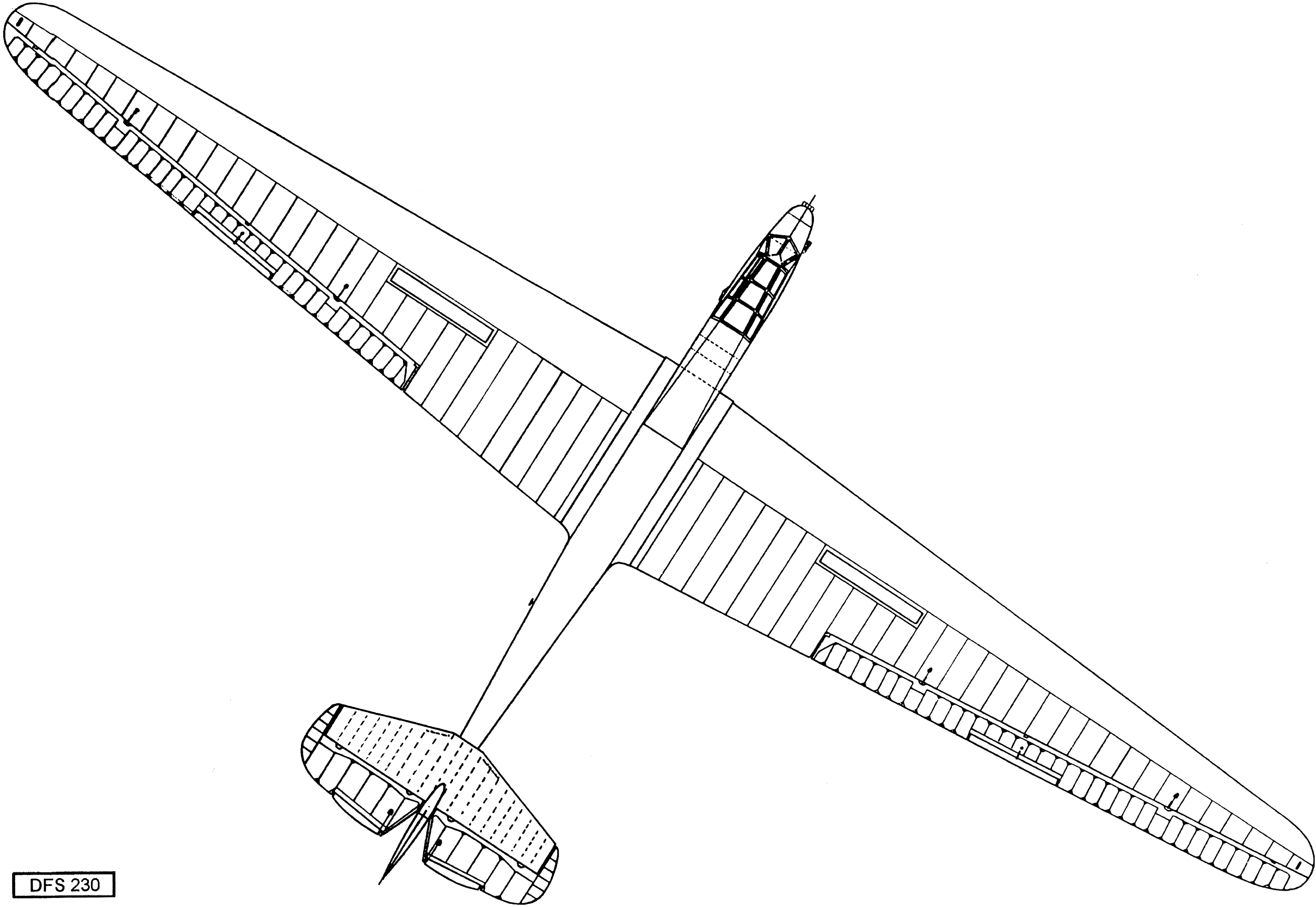
It was transported over a Do 217 in Mistel configuration up to 10,000 m from where it could go up to 23,000 m propelled by a Walter rocket..

The height could be maintained during 45 minutes by successive re-starts of the engine.
The cockpit was pressurised and heating and two infra-red Zeiss cameras were use for the photographic reconnaissance.

Two prototypes were built and flight tested in 1943 and 1944

TECHNICAL DATA

Type	High-altitude rocket glider
Phase	Flying test
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Retractable skid
Engine	One Walter HWK 109-509 bifuel rocket with 1,500 kp static thrust
Fuel tanks	C-Stoff and T-Stoff in the fuselage
Armament	None
Wingspan	17.6m
Length	10.59
Height	3.08
Wing area	30 m^2
Maximum weight	4,210 kg
Maximum speed	900 km/h
Ceiling	25,000 m.
Range	1,050 Km.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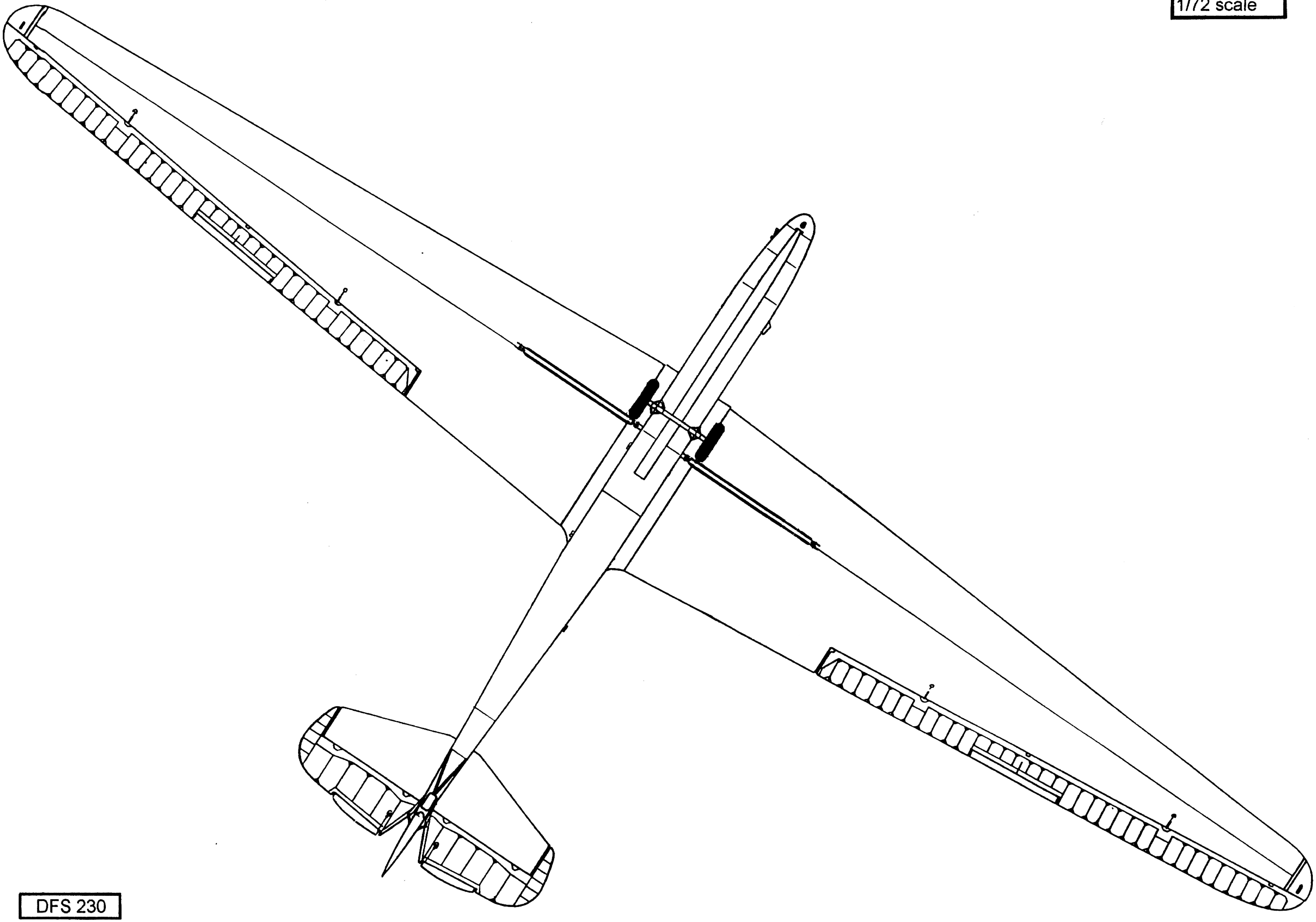
DFS 230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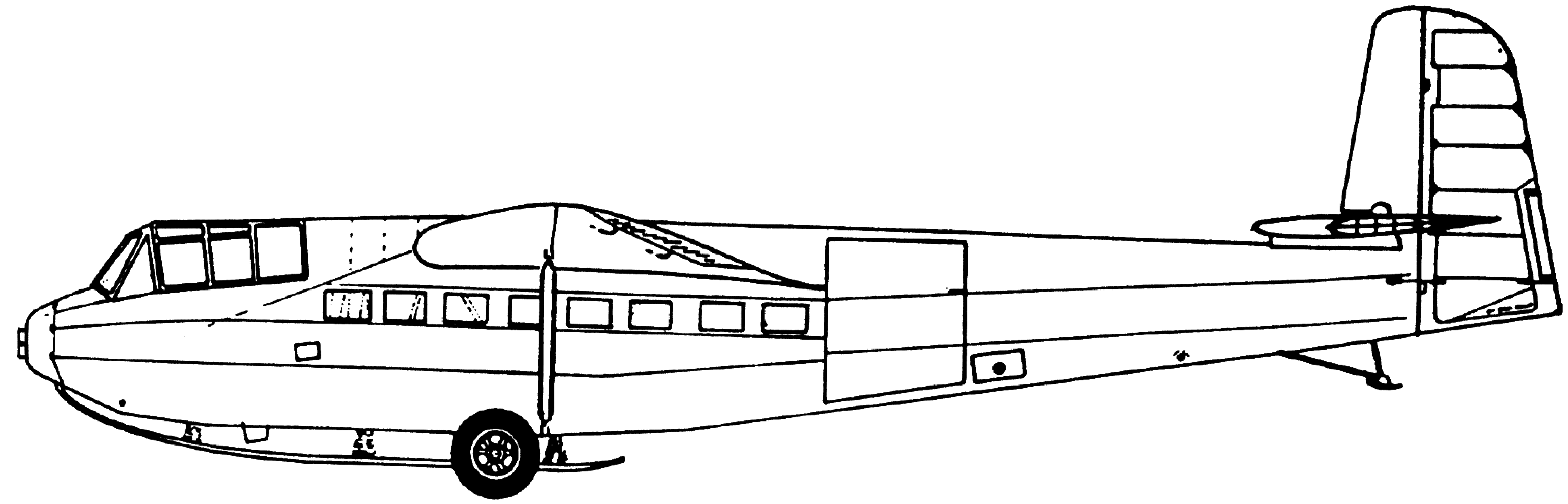
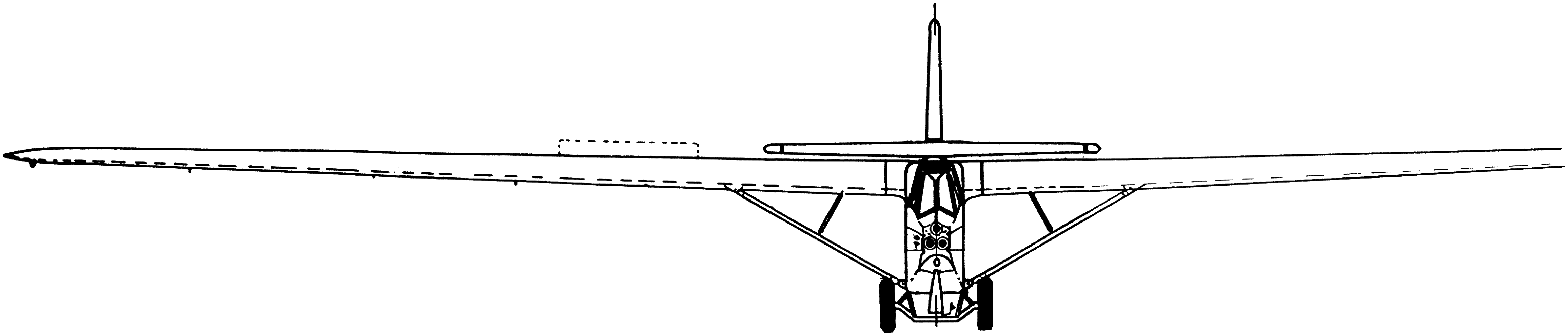
DFS 230





DFS 230

1/72 scale

DFS 230 C-1

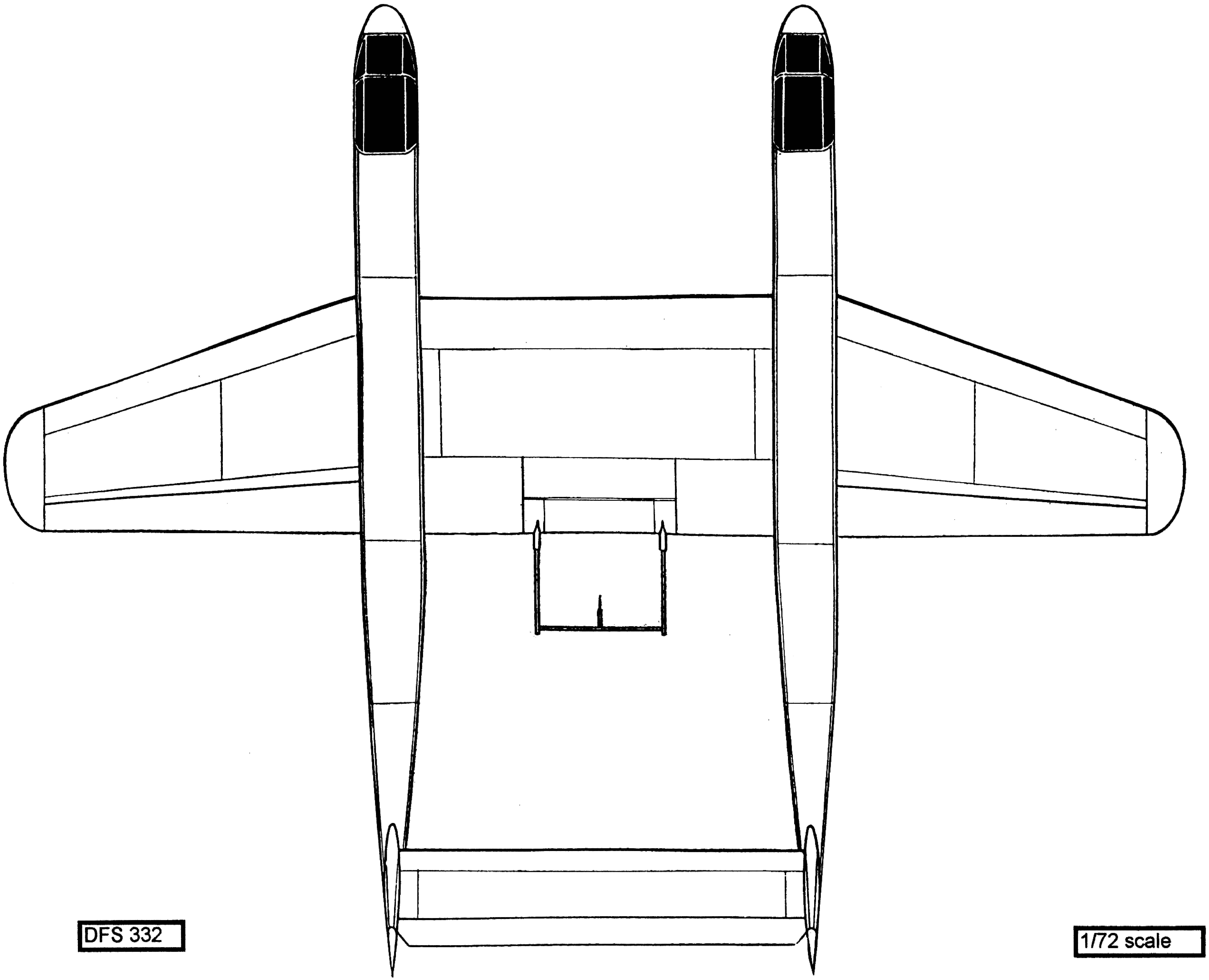
During October 1942, some short landing tests were performed with the glider DFS 230 V7 (DV+AV).

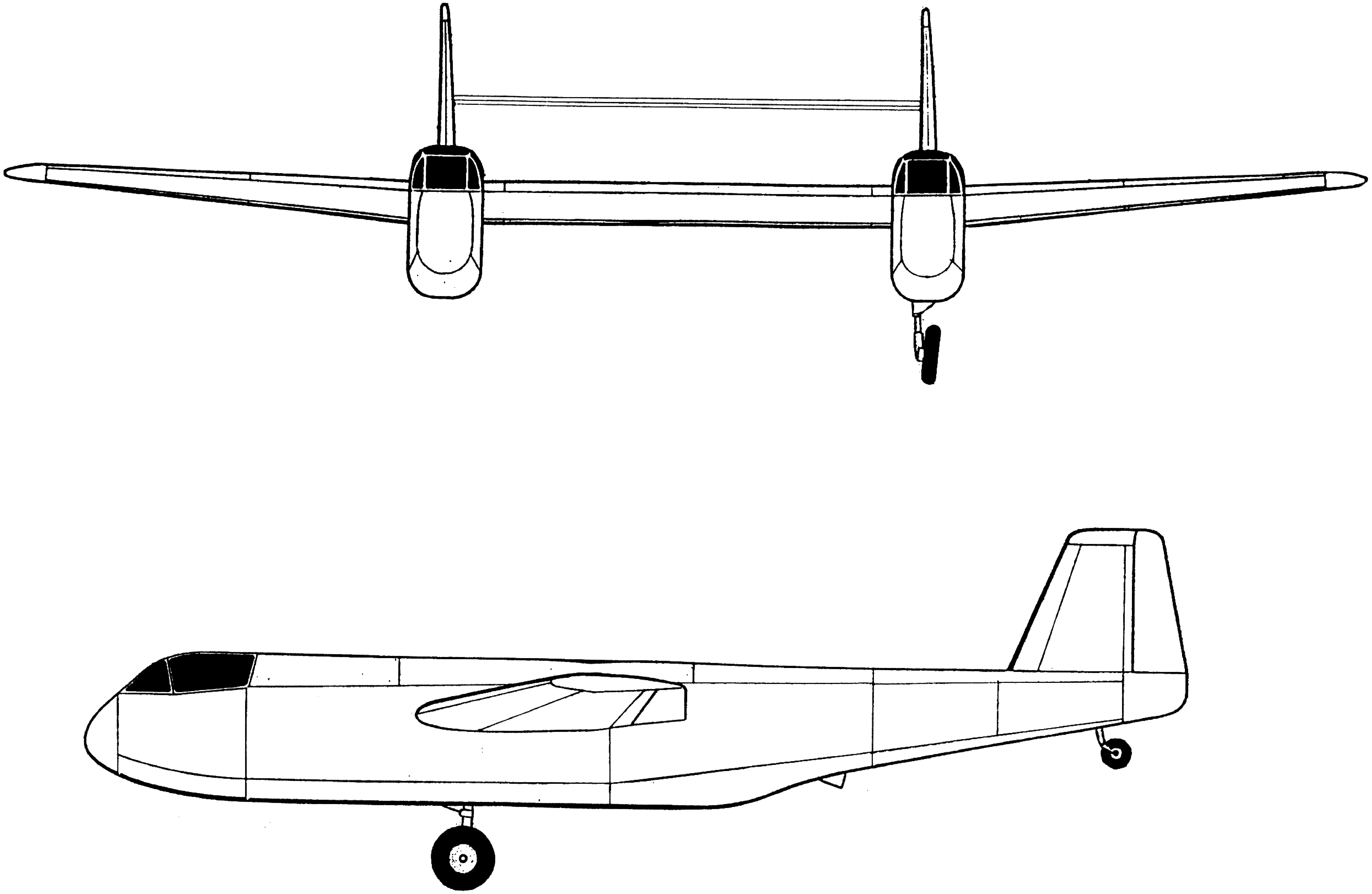
The airplane was fitted with a battery of 48 Sander retro-rockets installed in the nose. Its breaking action could reduce the landing distance from 200 m. to just 40 m with 10 men on board.

The success achieved in the tests led to the construction of an operational version known as DFS 230 C-1, fitted with a battery of three WASAG 109-532 retro-rockets

TECHNICAL DATA

Type	Cargo glider
Phase	Flying test
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	Detachable trolley plus landing skid
Wingspan	22.28 m
Length	11m
Height	3.7 m
Wing area	42.07 m^2
Maximum weight	2,150 kg
Maximum speed	290 km/h


DFS 332
1/72 scale



DFS 332

1/72 scale

DFS 332

Research airplane developed since 1941 to test advanced aerofoil sections during flight.

It was a twin-boom rocket glider with a pilot and an observer..

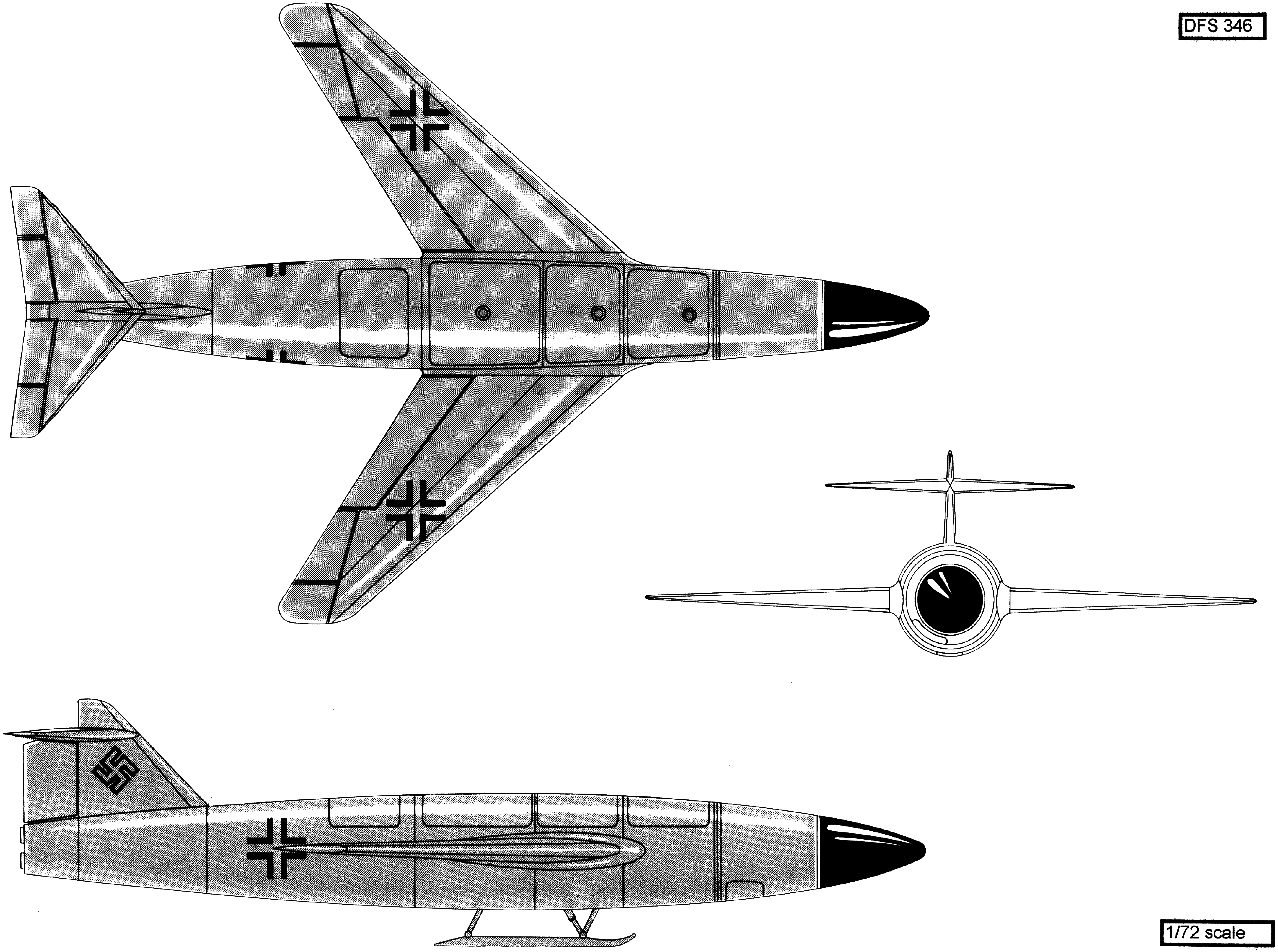
A 4.5 m section of the wing that was to be tested was installed between the two fuselages.

The prototype was never actually finished.

TECHNICAL DATA

Type	Research rocket glider
Phase	Prototype construction
Wings	Wooden structure and cladding
Fuselage	Wooden structure and cladding
Landing gear	Conventional retractable type
Engine	Two bifuel Walter RII-203 rockets with 750 kp of thrust each
Fuel tanks	One of T-Stoff and another of Z-Stoff in each fuselage
Wingspan	15.2 m
Length	12.25 m
Height	4 m
Wing area	37.5 m2
Maximum weight	3,200 kg
Maximum speed	500 km/h
Ceiling	9,800 m

DFS 346



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DFS 346

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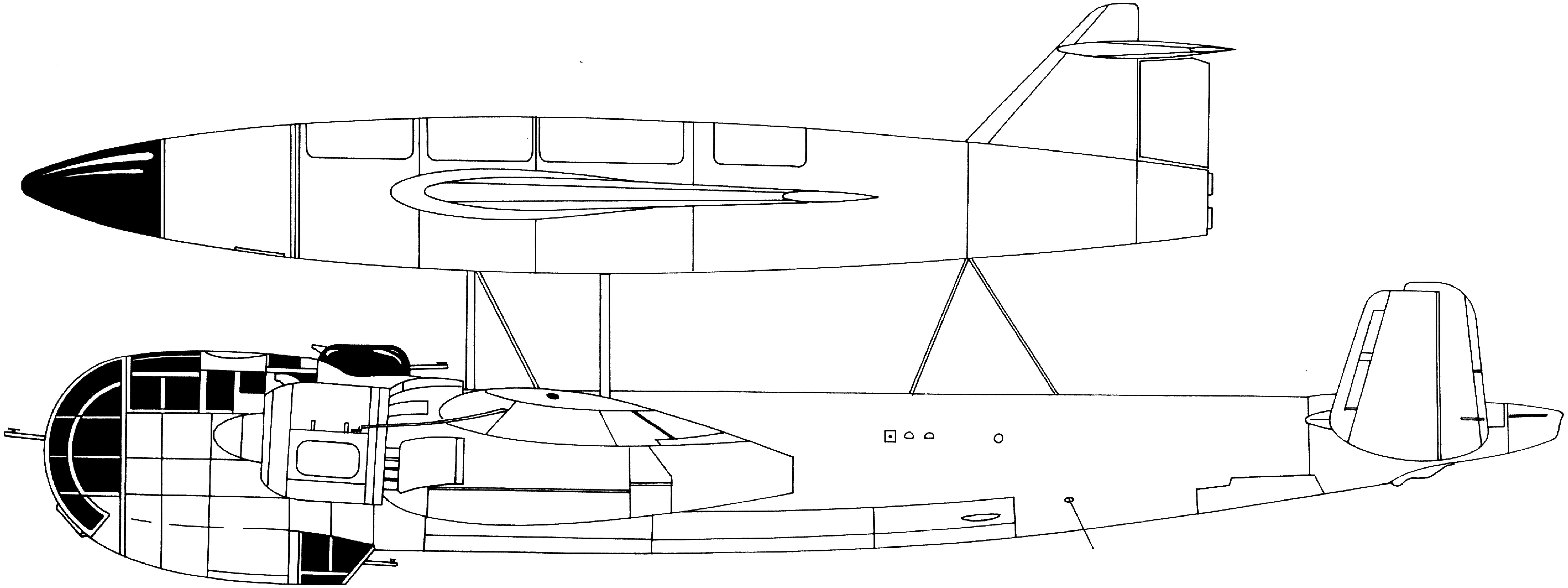
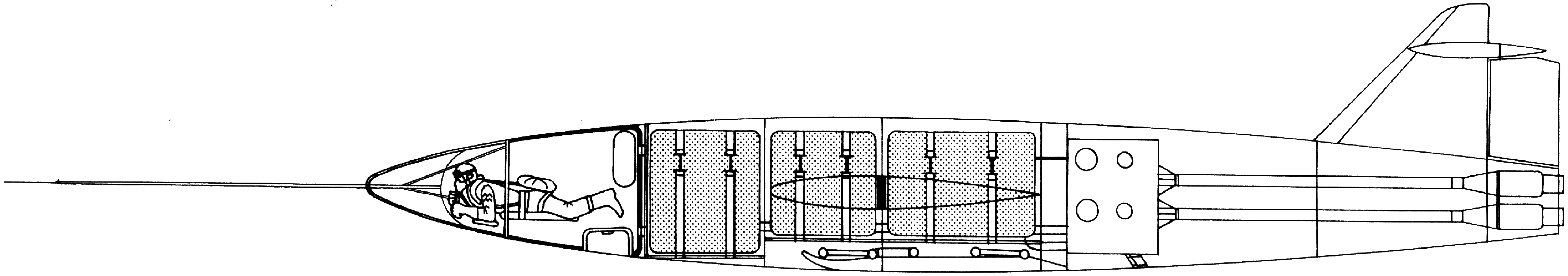
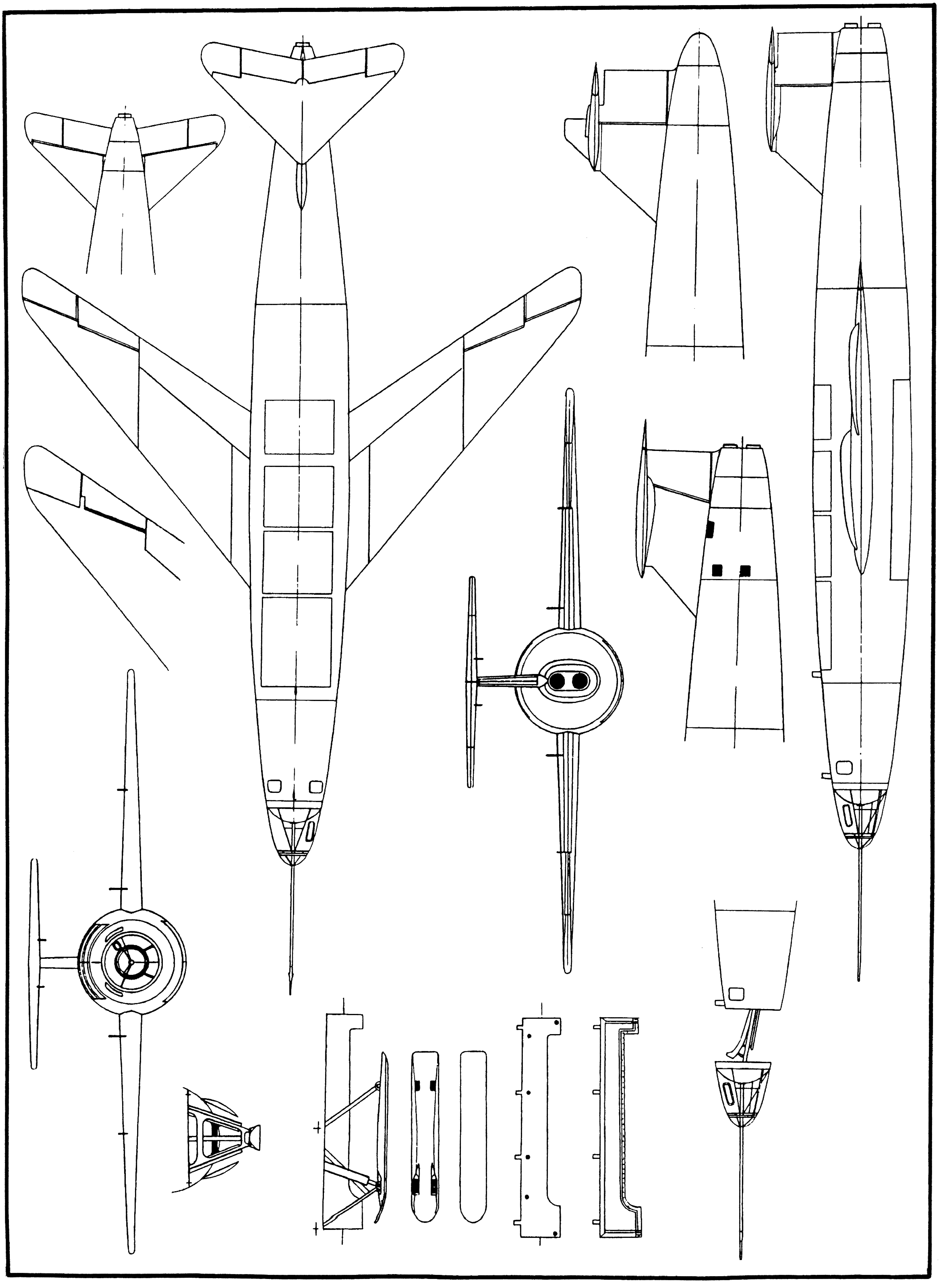






DFS 346

Transonic research airplane developed by the firm Siebel for the DFS in 1944.

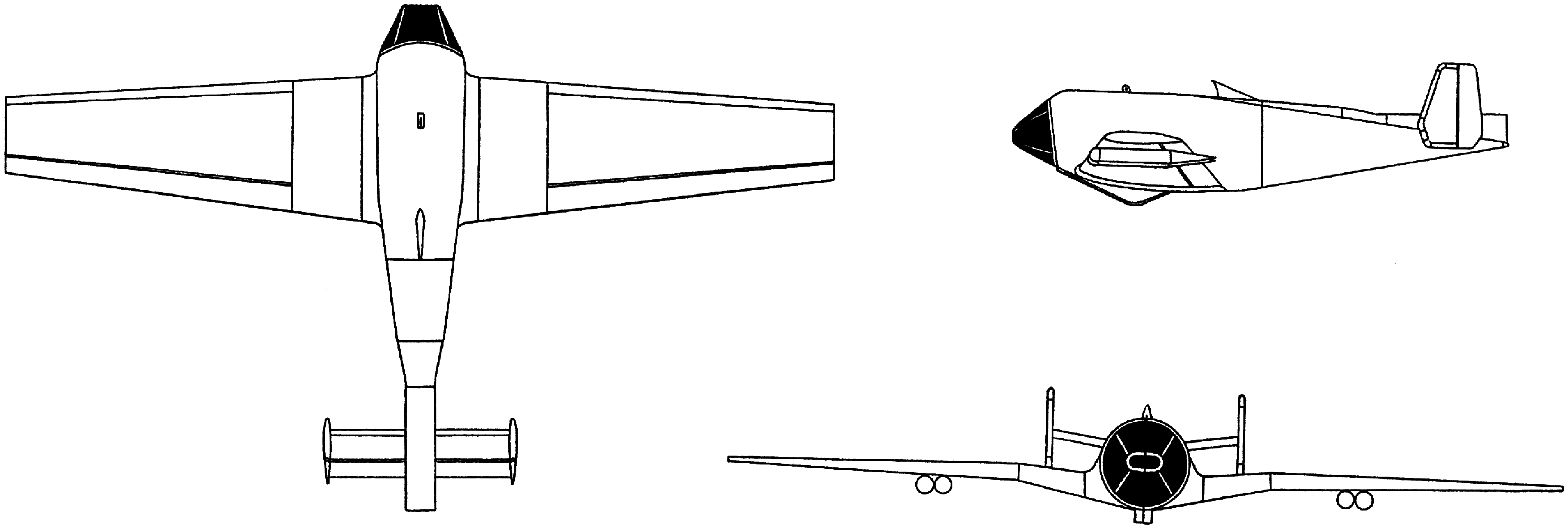
The airplane, fitted with 45° swept wings and T tail, should be transported over a Do 217 in a Mistel configuration up to a height of 10,000 m to save fuel.

It was expected that the simultaneous start up of both Walter rockets would make him reach Mach 2.6 at 35,000 m

Two prototypes at different construction phases were captured by the Soviets in 1945.

TECHNICAL DATA

Type	Transonic research airplane
Phase	Prototype building
Wings	45° swept, Metallic structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Three retractable skids in wings and fuselage
Engine	Two Walter HWK 109-509 B rockets with 2,000 kp of thrust each
Fuel tanks	One of T-Stoff and two of C-Stoff in the fuselage
Wingspan	8.9 m
Length	11.65 m
Height	3.5 m
Wing area	20 m^2
Maximum weight	6,900 kg
Maximum speed	Mach 2.6
Ceiling	35,000 m



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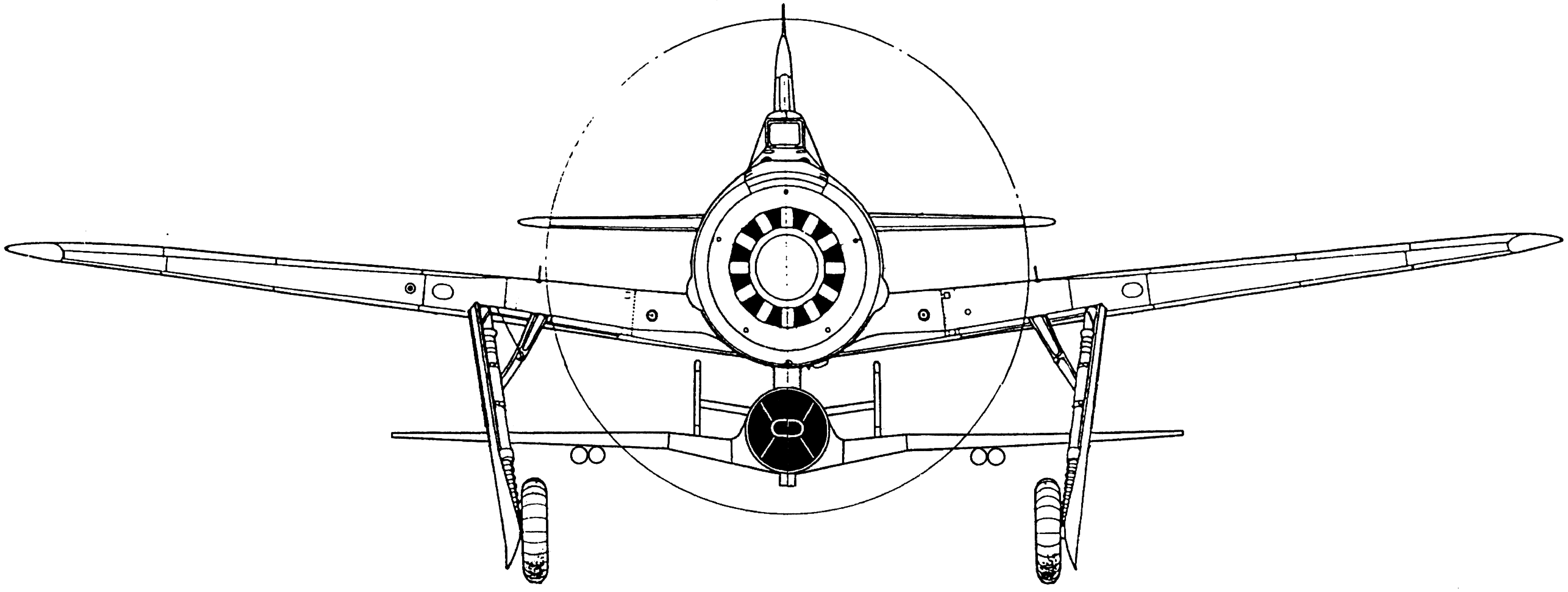
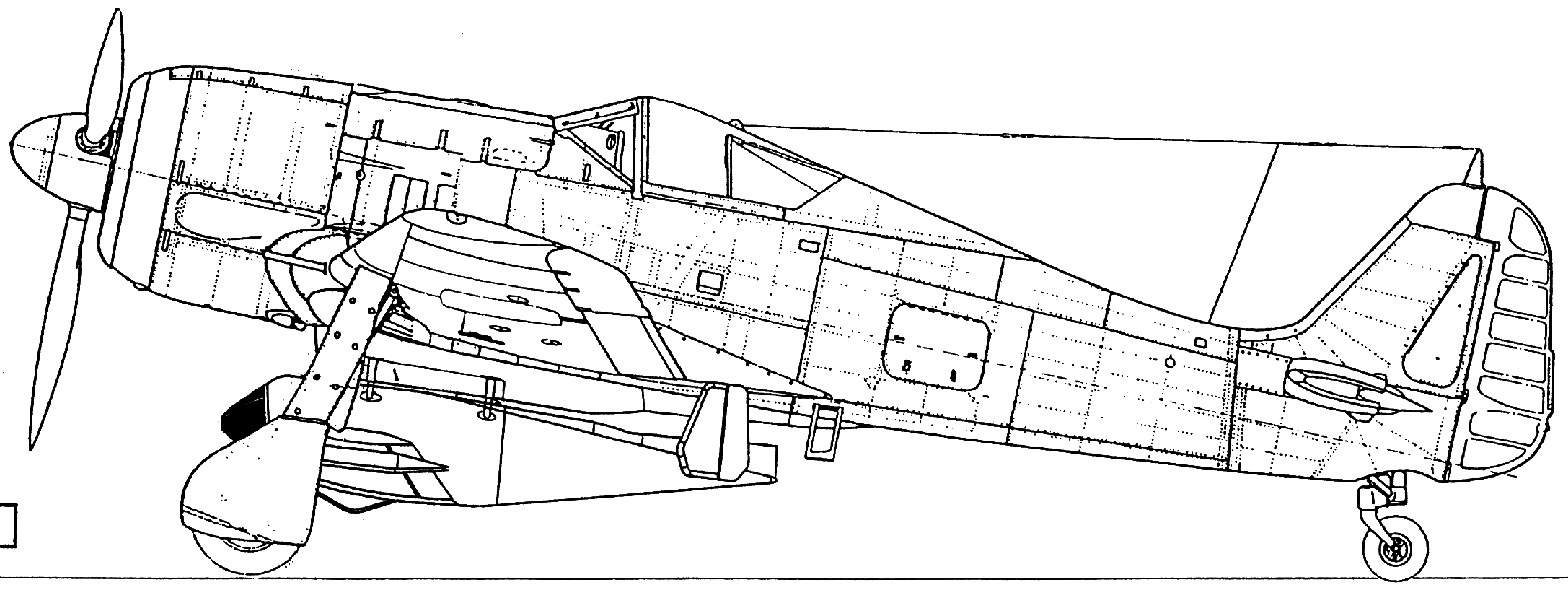
DFS "Rammer"





Fw 190 + DFS "Rammer"

1/48 scale

DFS "Rammer"

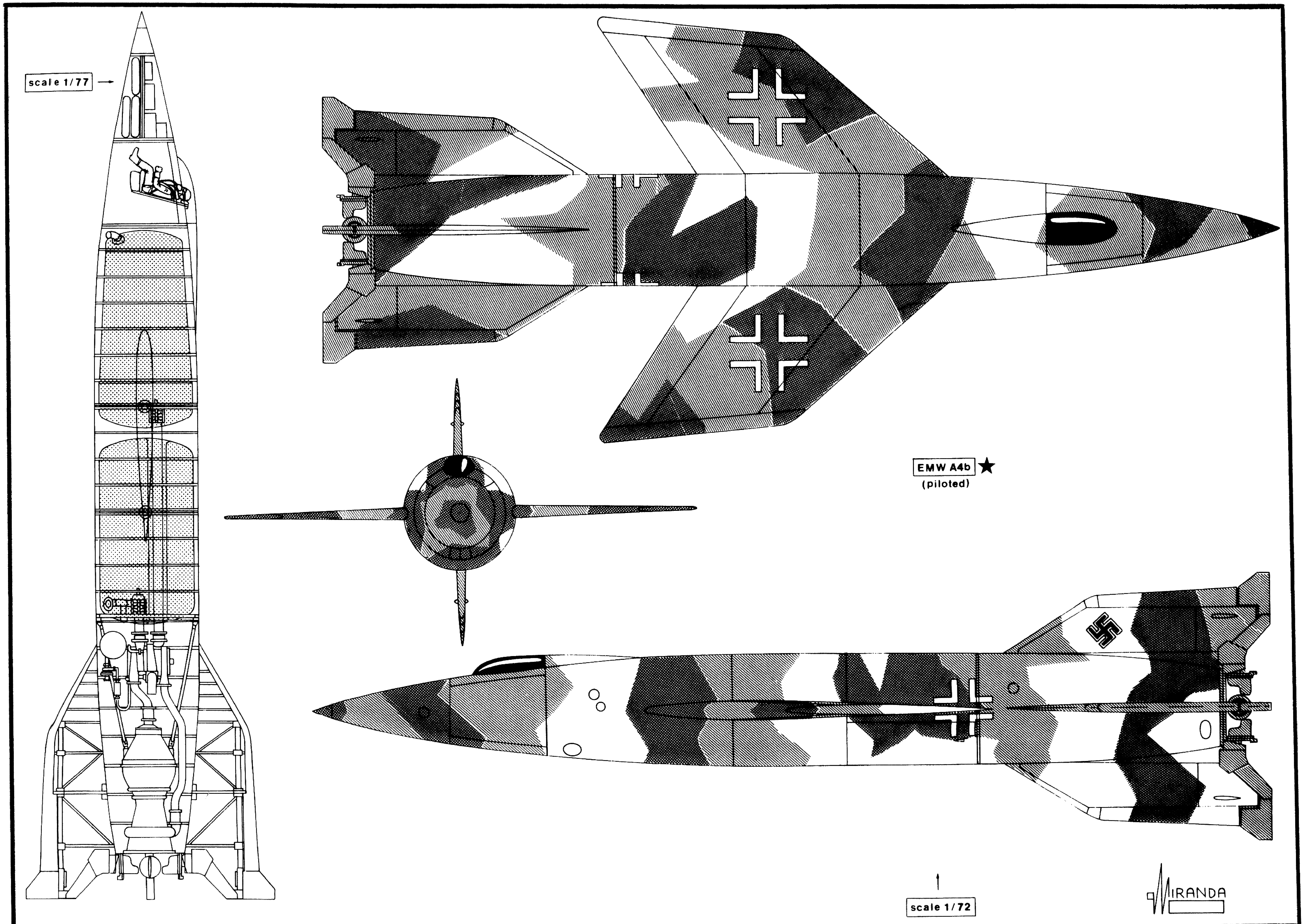
Armoured glider designed to be used for collision tactics against the Allies bombers (Rammjäger).
It was so small that could be transported under a Fw 190.

The fuselage included the pilot in prone position shielded by a plastic armoured nosecone and an accelerator rocket. The wings and empennages were designed to be detached during the impact.
A first attack with the RZ 65 rockets was foreseen before the impact.

In anti-ship missions, it was able to transport two bombs of 250 kg under the wings

TECHNICAL DATA

Type	Rammer
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Wooden structure and cladding
Landing gear	Fixed skid
Engine	A solid fuel Schmidding 109-533 rocket with 1,000 kp static thrust
Armament	Four RZ 65 Rheinmetall-Borsig or two bombs of 250 kg
Wingspan	5.3 m
Length	3 m
Height	0.9 m



EMW A4b ★
(piloted)

EMW A4b

The extraordinary increase on range reached after installing wings in an A4 (V-2) missiles for gliding flight, led von Braun to design three different manned versions. The A4b, manned as an aerodynamic research aircraft, the A9 as intercontinental bomber and the A6 as a photographic "reconnaissance aircraft operating at great height and speed".

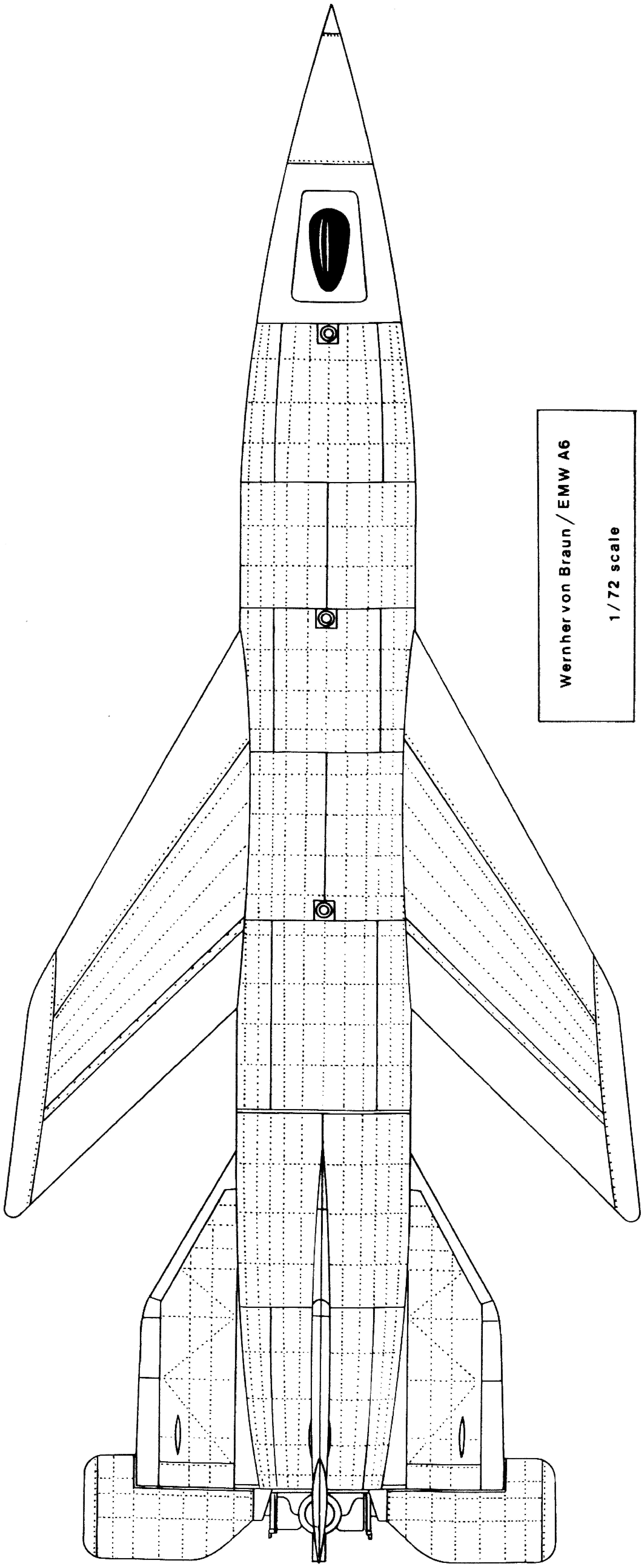
Actually, the military applications of these scientific research programmes were emphasised in order to obtain the necessary resources, given the wartime circumstances..

To test manoeuvrability and different types of planned wings a new piloted version of the A4b with pressurised cockpit, conventional landing gear and braking parachute was designed.

The problems experimented during the launch of the unmanned A4b advised the discontinuation of the project until finding out the reason why the wings were detached during the entrance in the dense layers of the atmosphere.

TECHNICAL DATA

Type	Supersonic rocket glider
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Tricycle type.
Engine	An EMW bifuel rocket with of 27,500 Kp static thrust
Fuel tanks	A-Stoff, M-Stoff, T-Stoff and Z.Stoff in the fuselage
Armament	None
Measures	**Span:** 6.3m. **Length:** 15.75 m. **Height:** 6.3 m.
Maximum speed	Mach 2
Ceiling	95,000 m.



Wernher von Braun / EMW A6

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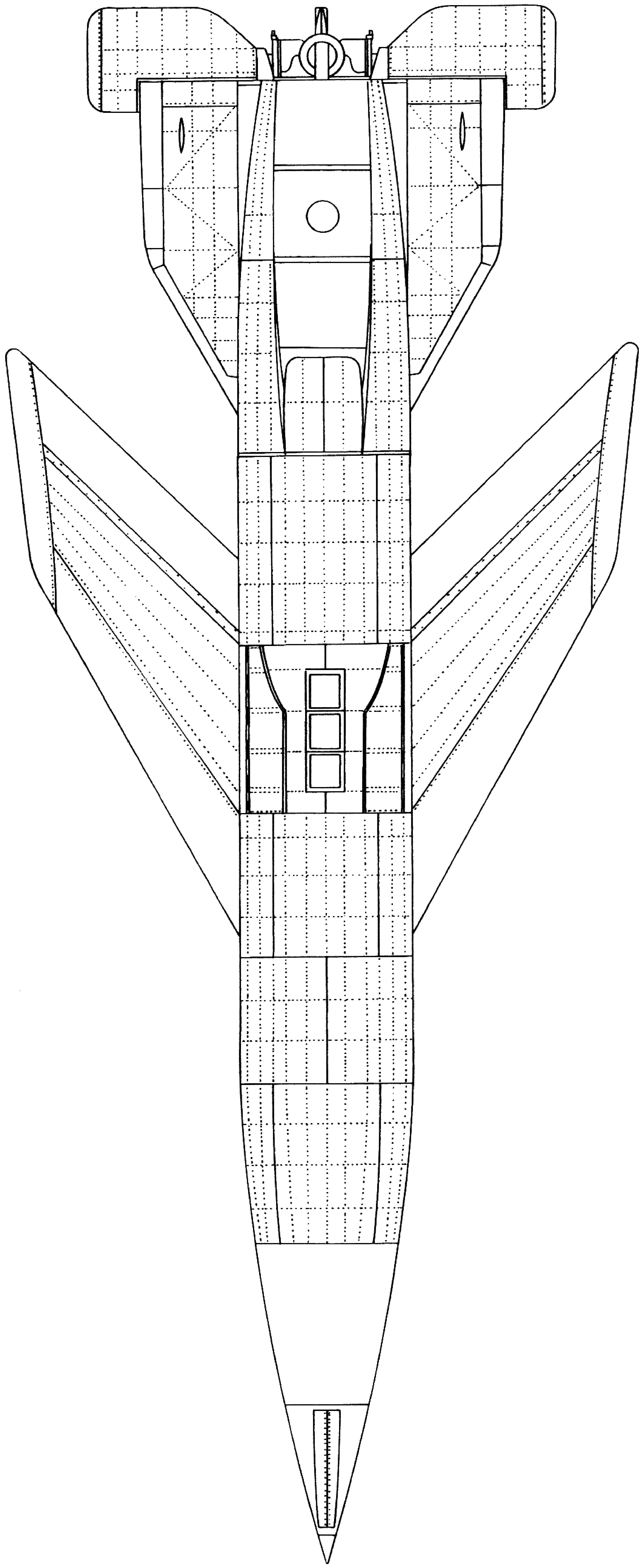

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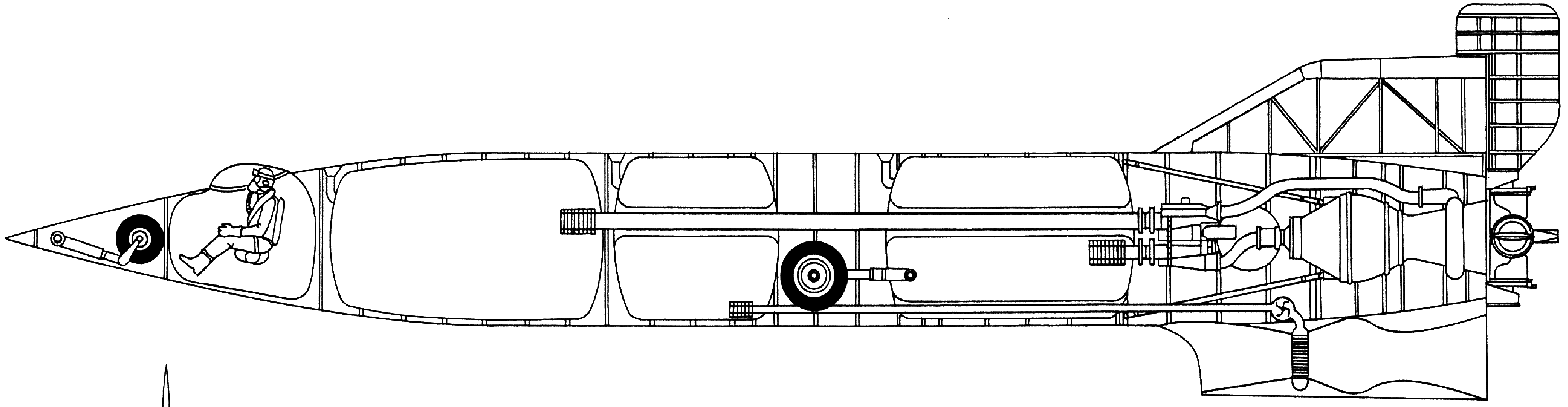
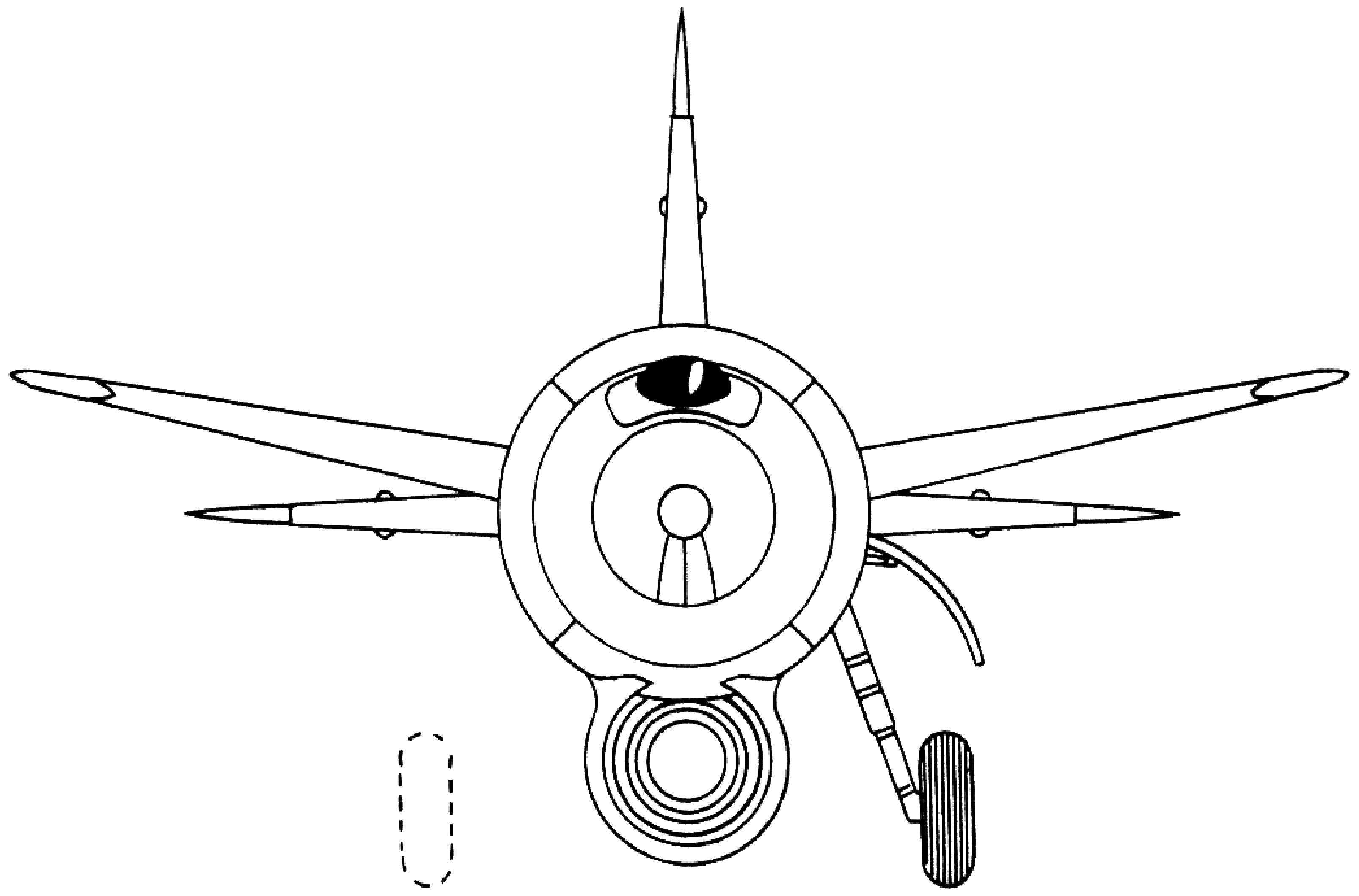
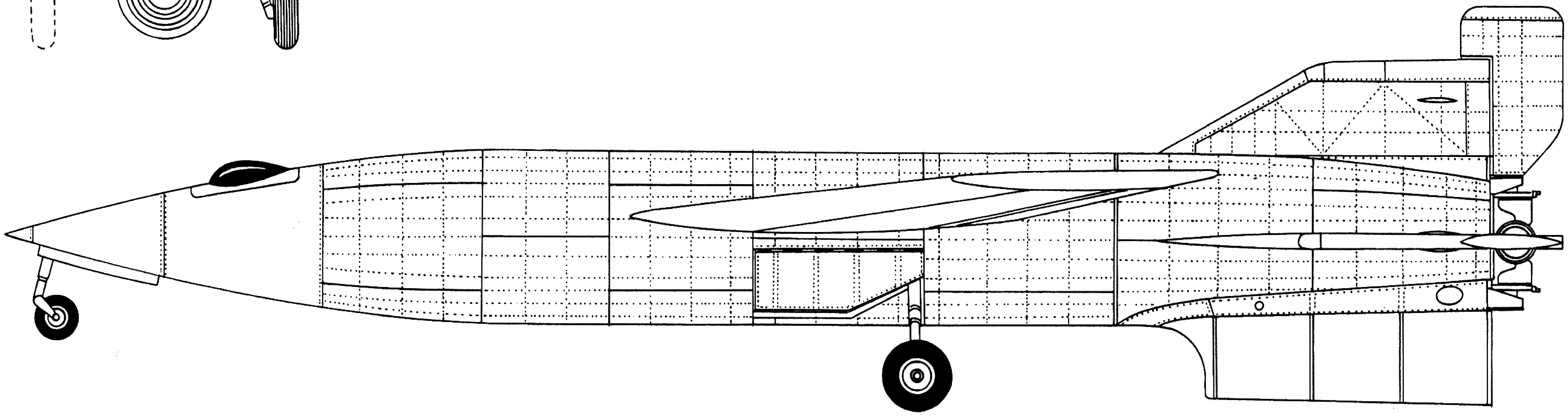




Wernher von Braun / EMW A6

1/72 scale



EMW A6

The extraordinary increase on range reached after installing wings in an A4 (V-2) missiles for gliding flight, led von Braun to design three different manned versions. The A4b, manned as an aerodynamic research aircraft, the A9 as intercontinental bomber and the A6 as a photographic "reconnaissance aircraft operating at great height and speed".

Actually, the military applications of these scientific research programmes were emphasised in order to obtain the necessary resources, given the wartime circumstances..

The A6 could have been an hypersonic research aircraft, equipped with an auxiliary engine of the Ramjet type which could only be started at very high speed.

This was feasible in this type of aircraft only at the peak of their trajectory, flying at a very high speed with no propellant left in the main rockets.

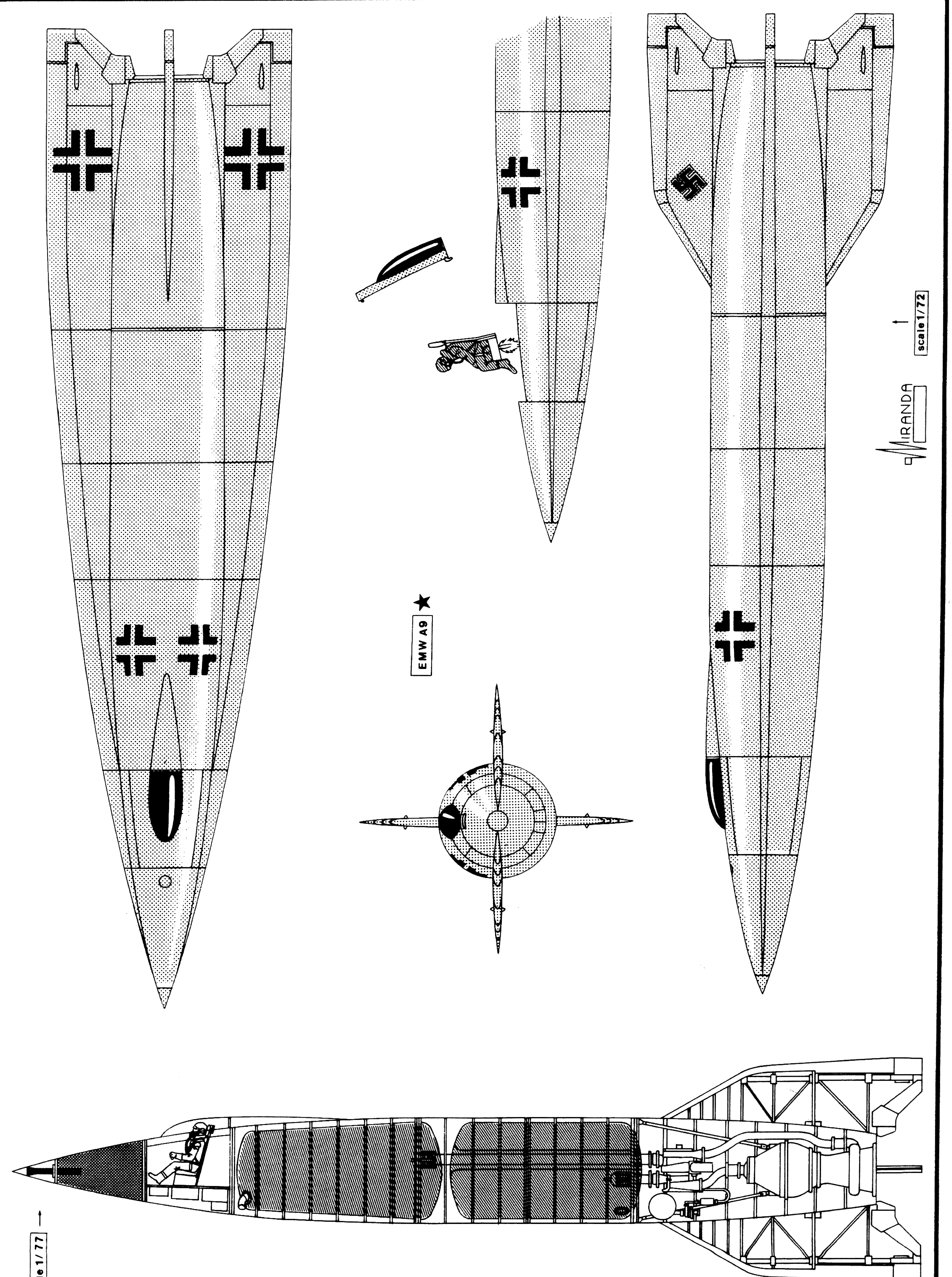
Under these circumstances, the Ramjet engine (working with synthetic petrol) gave the A6 the possibility to continue flying during fifteen or twenty minutes without any loss of speed or height.

As a reconnaissance aircraft, the A6 would have been impossible to intercept, but its flight characteristics were above the OKL needs and the project was rejected.

The A6 was fitted with a pressurised cockpit, landing gear and braking parachute.
It was vertically launched as an A4 and landed over a conventional landing strip by its own means.

TECHNICAL DATA

Phase	Design
Type	Hypersonic research aircraft
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding containing, from nose to rear, the frontal landing gear the pressurised cockpit, the methyl alcohol tank, the petrol tank (Br-Stoff) for the Ramjet, the housing for the main landing gear and the payload (instruments, cameras, etc.) Also the liquid oxygen tank, the rocket mechanisms compartment and the rocket combustion chamber were within the fuselage.
Empennage	Metallic structure and cladding, complemented with small vanes installed in the exhaust nozzle of the rocket. To allow the Ramjet installation, the ventral fin usually fitted to the A4 and A4b was removed
Landing gear	Tricycle type.
Engines	An EMW with a thrust of 27,500 Kp and an acceleration up to 6G. Also a Ramjet of non specified type and thrust.
Propellants	A-Stoff (liquid oxygen) and M-Stoff (Methanol)
Pressurizers	T-Stoff (hydrogen peroxide)and Z-Stoff (watery solution of sodium or calcium as a catalyst for the T-stoff) acting as a turbopump of 730 h.p. bottles of nitrogen and pressurised air
Measures	**Span:** 6.3m. **Length:** 15.75 m. **Height:** 4.07 m. **Maximum diameter:** 1.73m
Maximum speed	2,900 km/h
Ceiling	95,000 m.



EMW A9
scale 1/72
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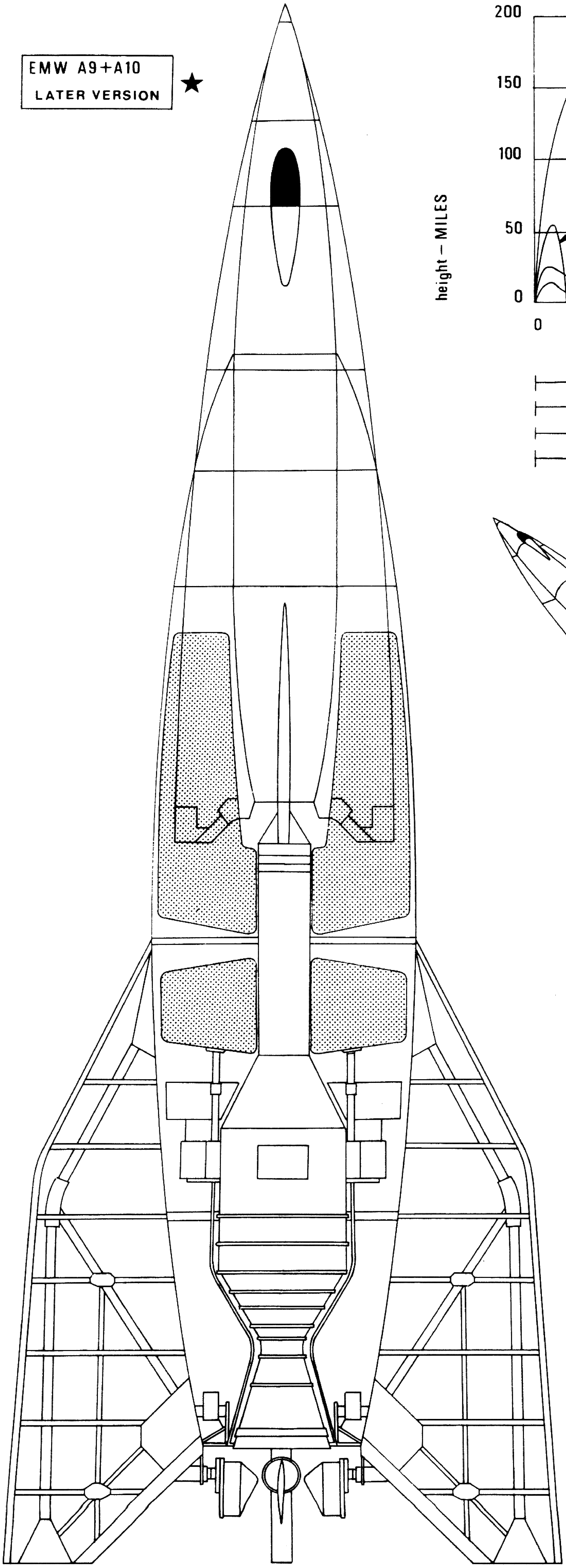
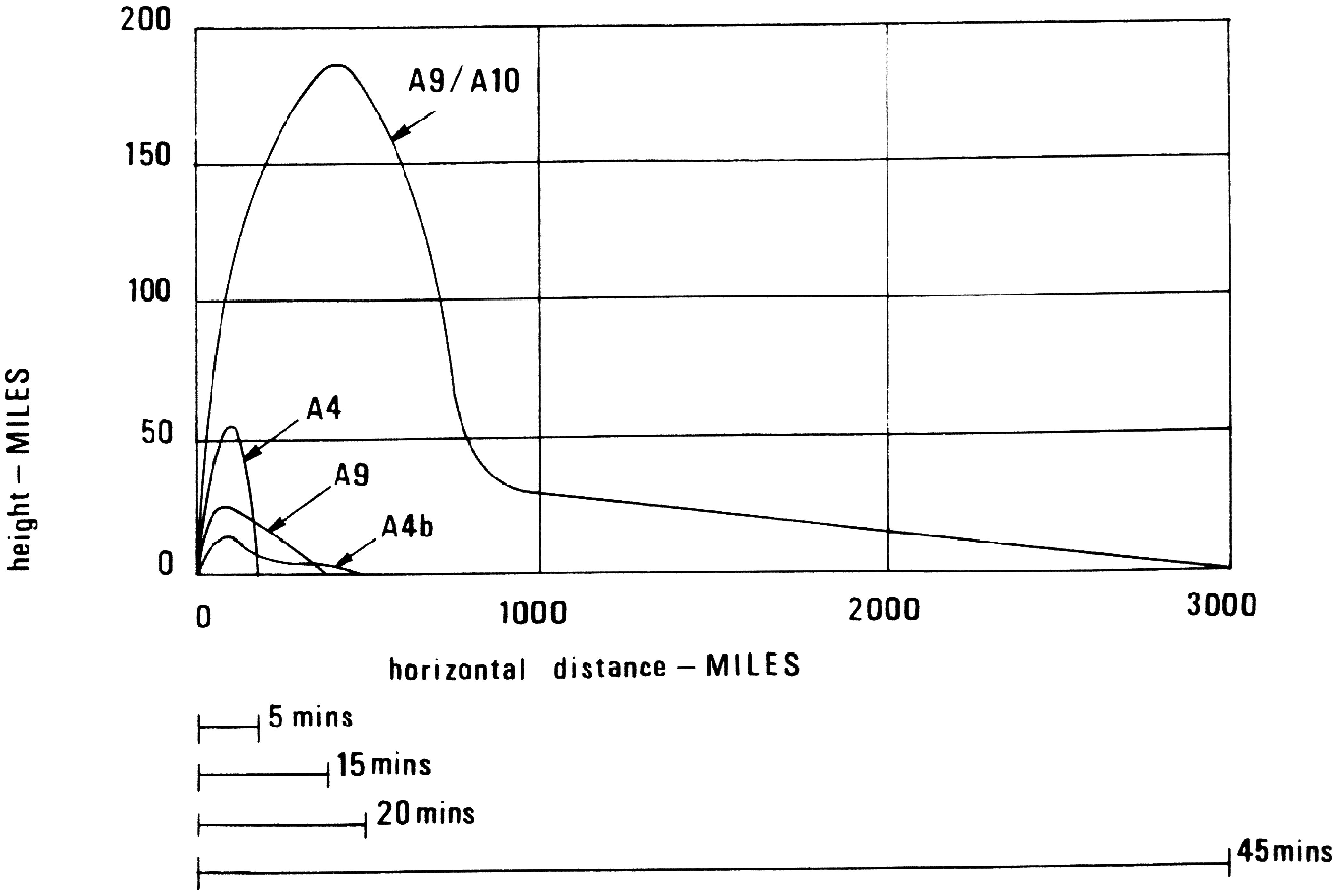
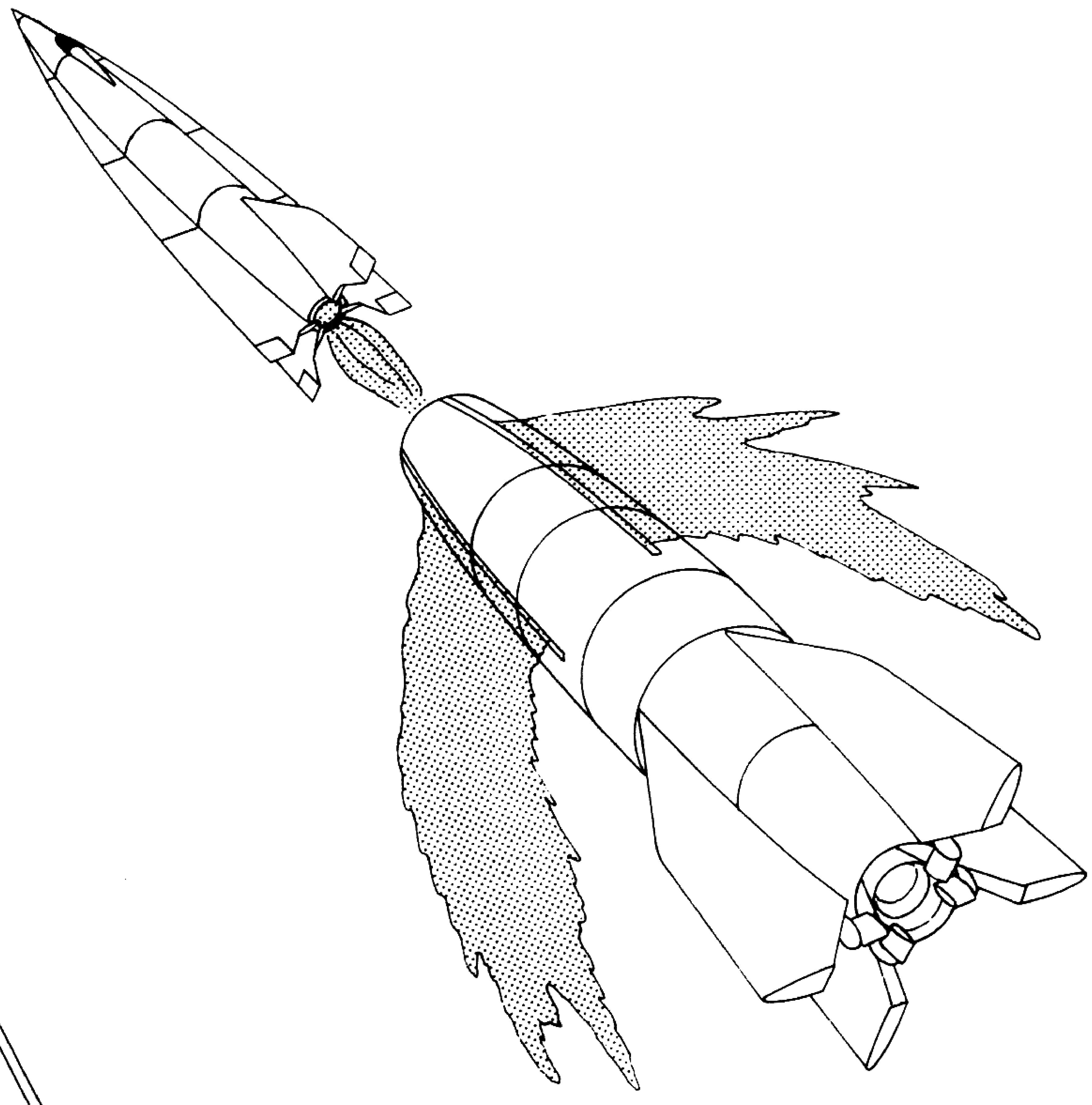
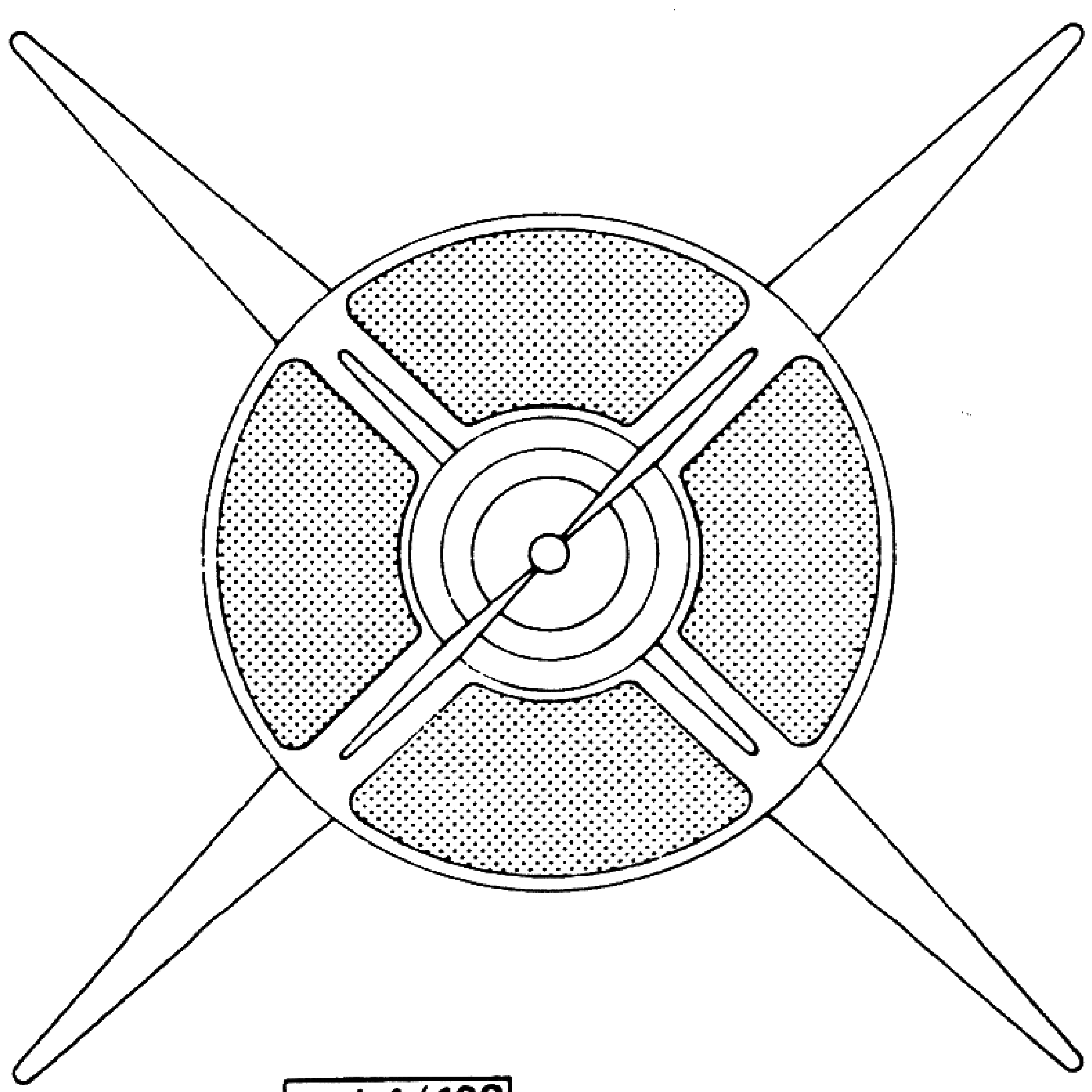
EMW A9+A10
LATER VERSION ★









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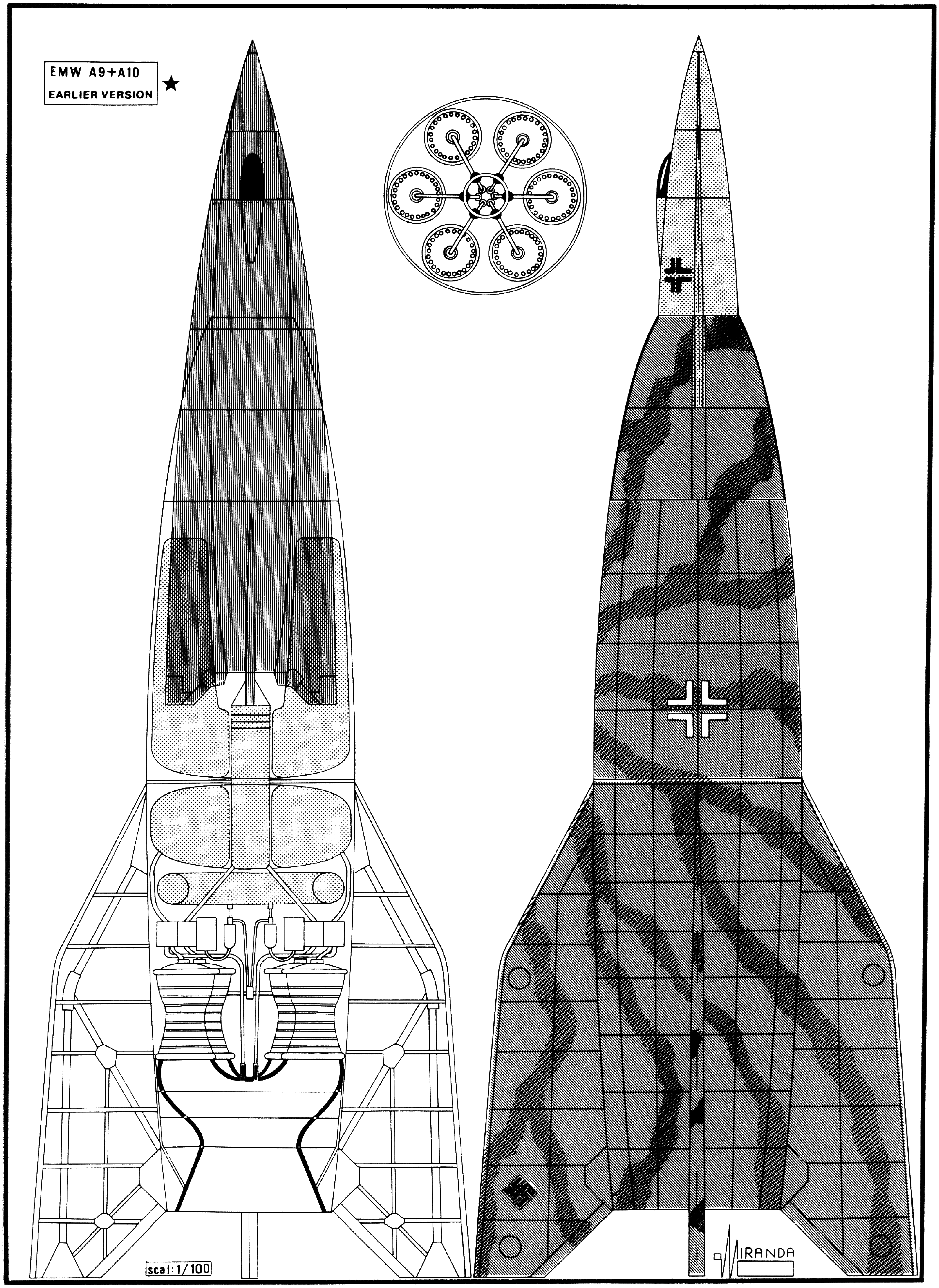
MIRANDA
JAN 88


EMW A9+A10
EARLIER VERSION ★
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MIRANDA

EMW A9/A10

The Wehrmacht answer to American raids was the “Projekt Amerika”, a weapon system of a great range based on the two-stage missile EMW A9/A10 and able to bomb New York.

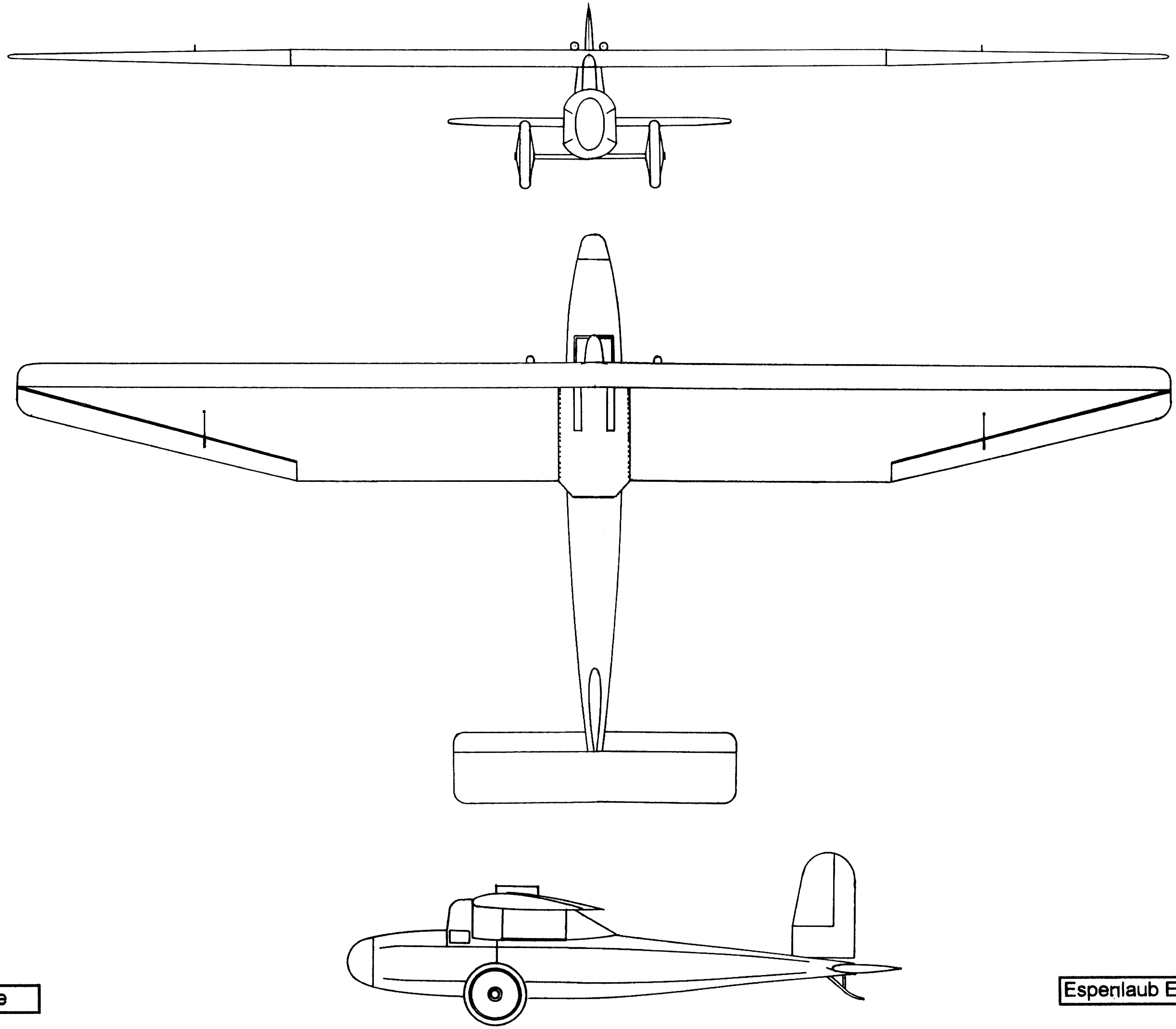
The A10 was a very big accelerator rocket conceived to put an A4 at a height of 24 km with all its propellant load to multiply its range.
The original project implied the use of a test model propelled by six combustion chambers of the A4 type, with a common venturi nozzle. The technology used was already known (LOX and alcohol plus hydrogen peroxide turbopumps) and it was enough to prove the project’s feasibility.

A more advanced version, intended for real operations, was projected to replace the A4 for an A9 with a wider gliding range and fitted with a warhead of 910 kg of Amatol 60/40 and a terminal guidance of radar-points based on submarines. It was also foreseen to make a piloted version to improve its accuracy.

As for the operational version of the A10, this should be propelled by a single enormous engine able to work with nitric acid (Salbei) and diesel oil that were easier to produce and stock than cryogenic propellants.

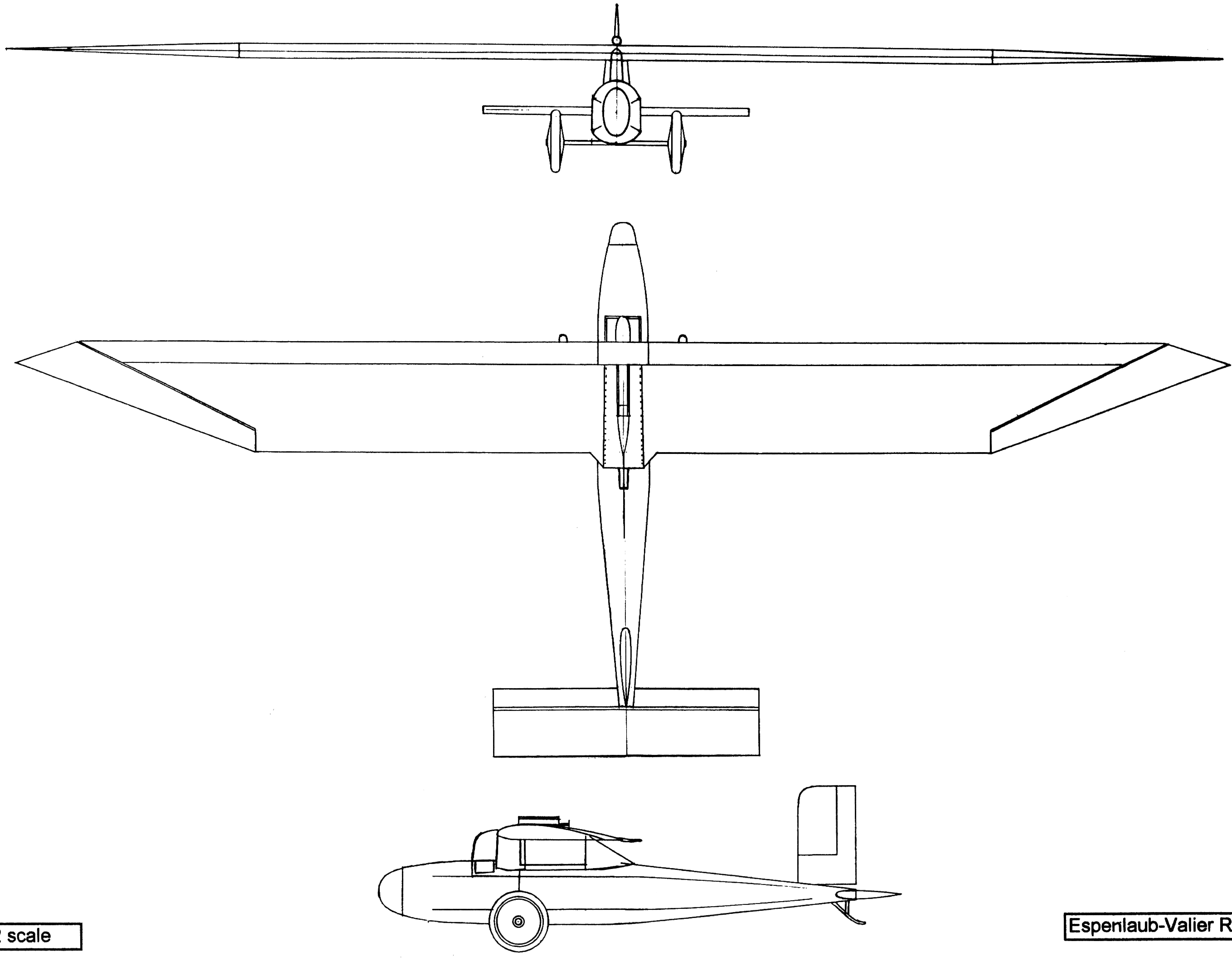
TECHNICAL DATA (A9)

Type	Intercontinental bomber
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit. Ejectable seat
Landing gear	None.
Engine	An EMW bifuel rocket of 25,400 Kp thrust
Fuel tanks	Visol, Salbei, T-Stoff and Z.Stoff in the fuselage
Armament	910 kg. Amatol 60/40 warhead
Maximum weight	16,260 kg.
Maximum speed	2,800 m/s
Ceiling	160,000 m.
Range	5,000 km



1/72 scale

Espenlaub EA-1



Espenlaub-Valier Rak 3

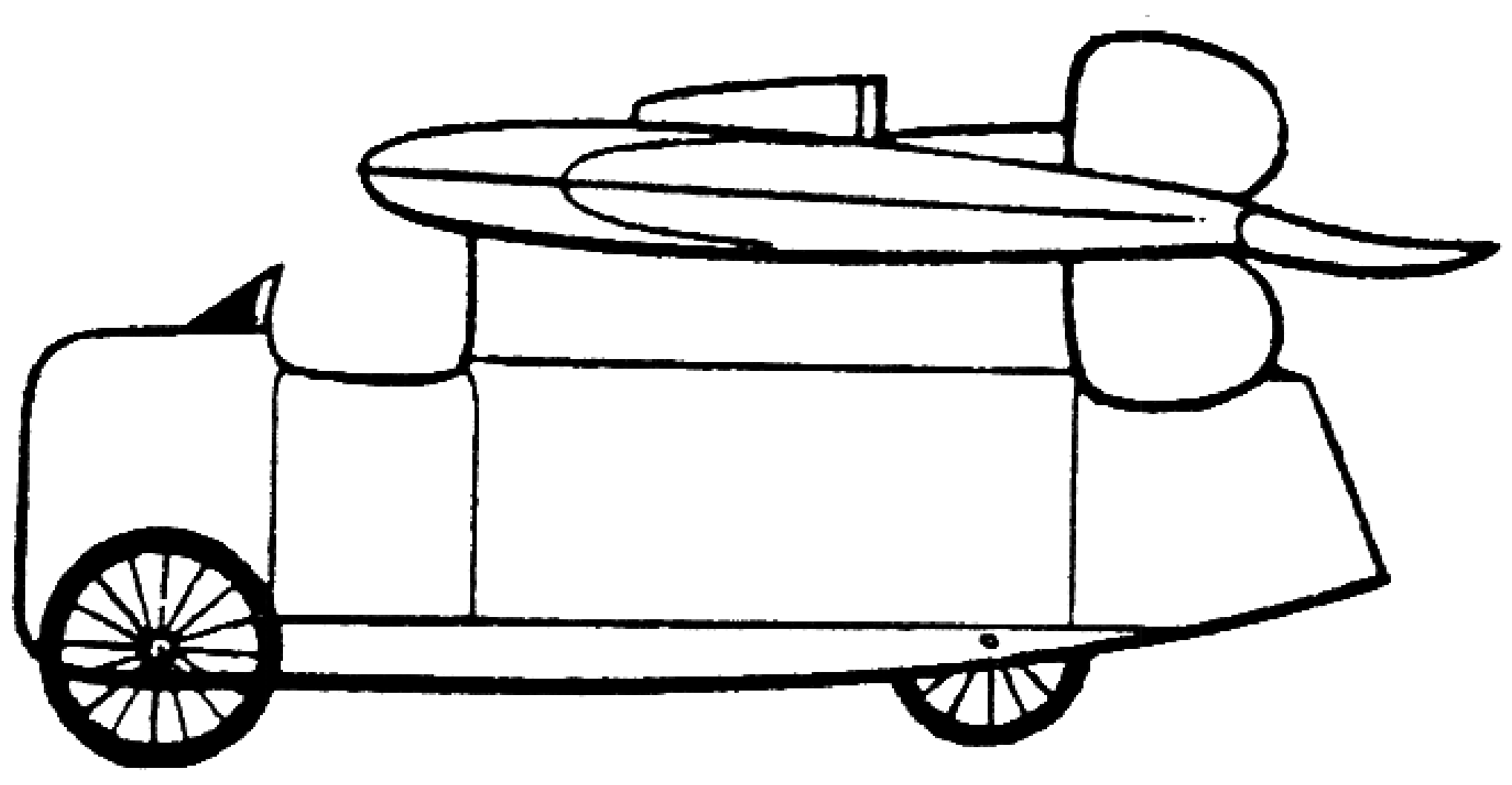
1/72 scale

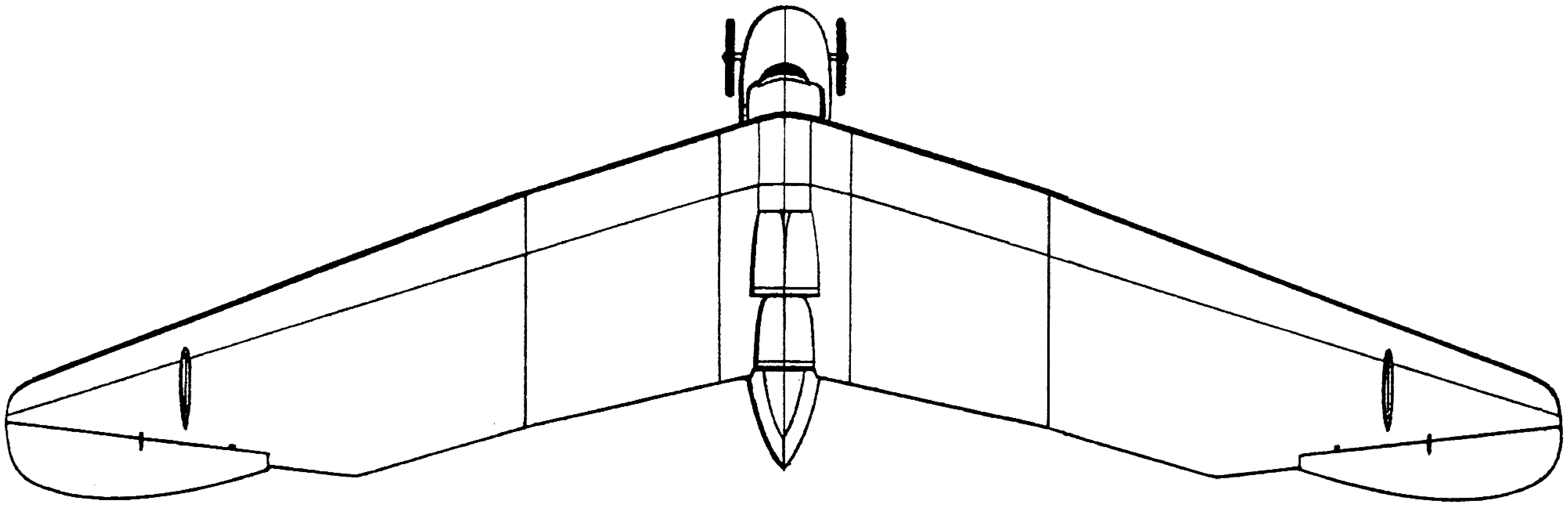
Espenlaub/Valier "Rak 3"

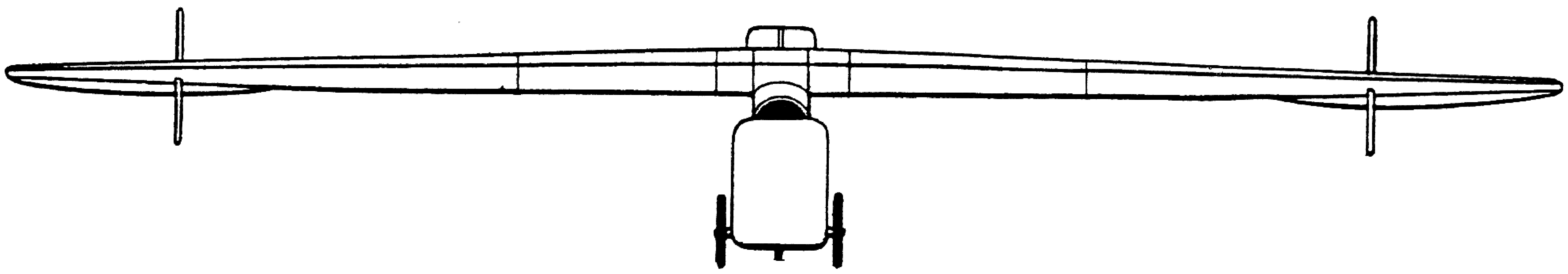
Gottlob Espenlaub was the owner of an airplane factory that made light planes and gliders in Wuppertal.
At the request of Max Valier and Alexander Sander, Espenlaub agreed to install two Sander rockers over the central section of the wing of an EA-1 glider to perform an static test.
Little afterwards, the EA-1 was modified for the flight tests under the name Rak.3 achieving its first take off on 23 October 1929

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Flying test
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	Conventional, fixed
Engine	Two Sander rockets of solid fuel with 25 kg thrust each
Wingspan	16.5m
Length	7.1 m.
Height	2.3 m.
Wing area	19.5 m^2







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Espeulaub E-15

Espenlaub E.15

When the tailfin of the Rak-3 was burnt during one of the flying tests, Espenlaub, helped by the Swiss engineer A. Sohldenhoff, decided to build an airplane specifically designed for rocket propelled flight

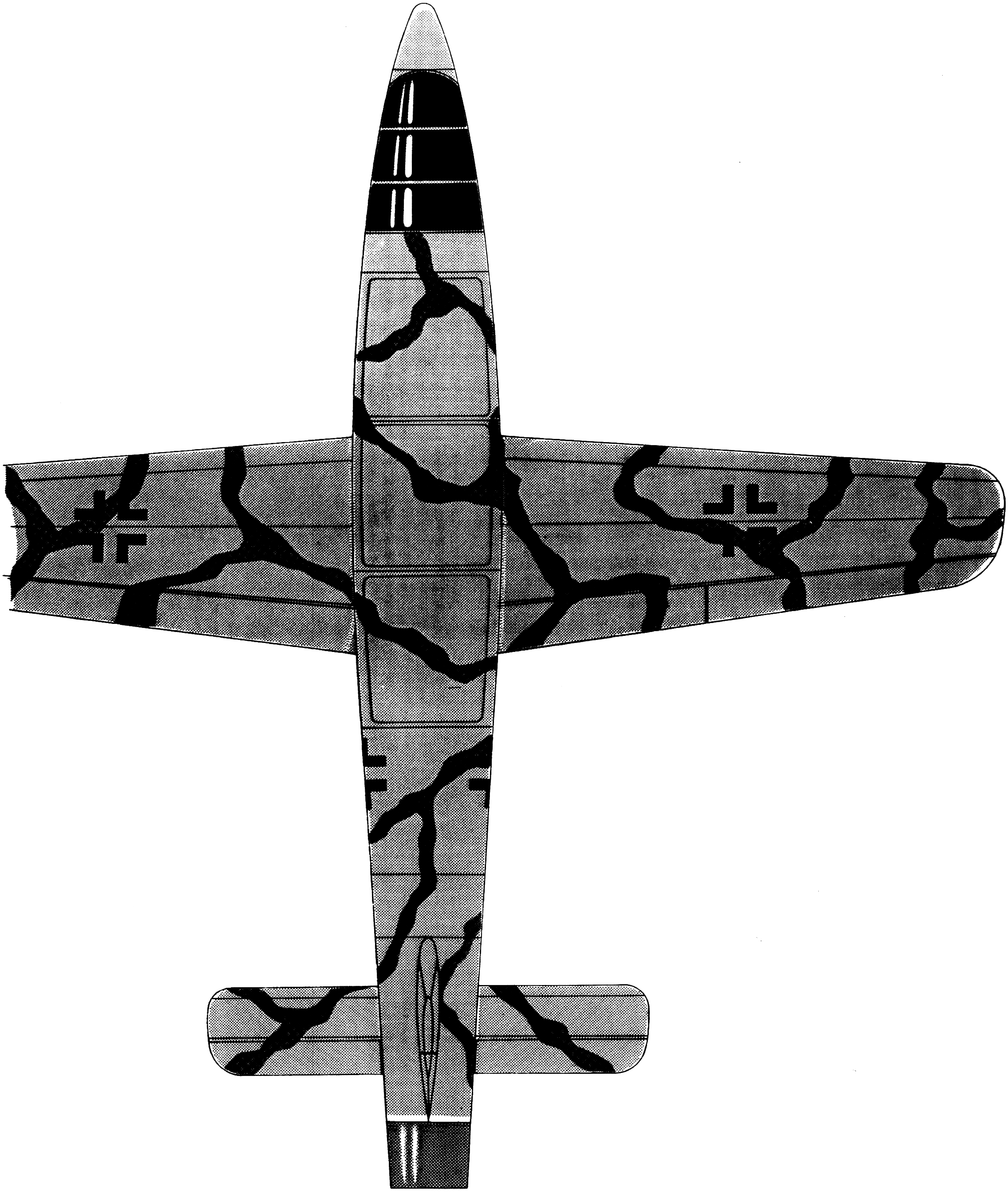
The new design was named E.15 and had a high wing with 18° swept, twin fins and a very safe landing gear.
The flying tests were performed with the piston engine Daimler of 20 hp. Afterwards, two groups of rockets were installed on the central section of the wing.
Two rockets with 80 kp of thrust each were used for take off and two more of 9 kg to be kept on flying.

The first rocket propelled flight took place on 4 May 1930.

The airplane was later destroyed in a crash

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Flying test
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	Conventional, fixed
Engine	Two Sander rockets of solid fuel with 80 kp thrust each and two of 9 kp
Wingspan	12 m
Length	3.9 m.
Height	1.9 m.
Wing area	17 m^2
Maximum speed	100 km/h

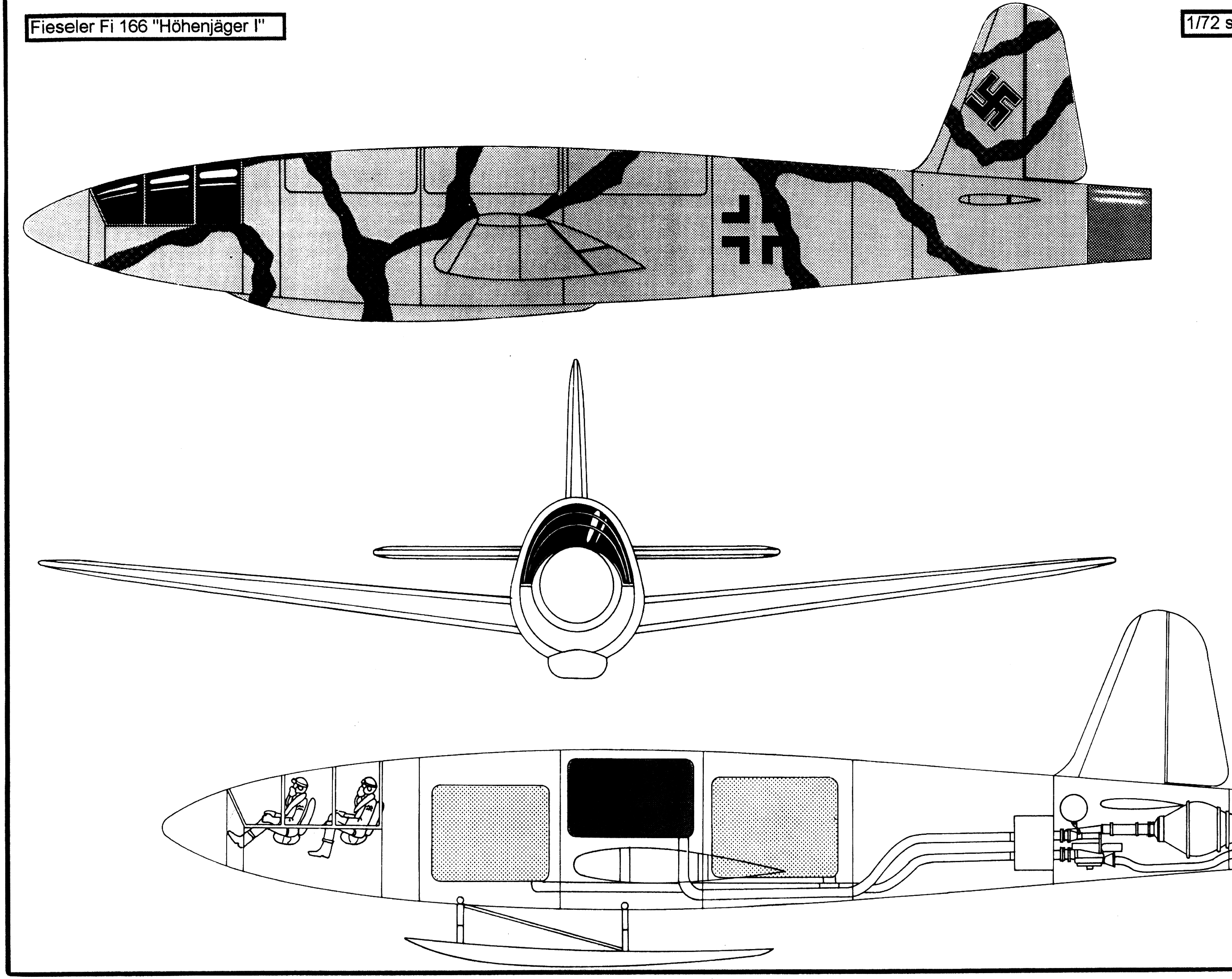


1/72 scale

Fieseler Fi 166 "Höhenjäger I"

Fieseler Fi 166 "Höhenjäger I"

1/72 scale



Fieseler Fi 166 "Höhenjäger"

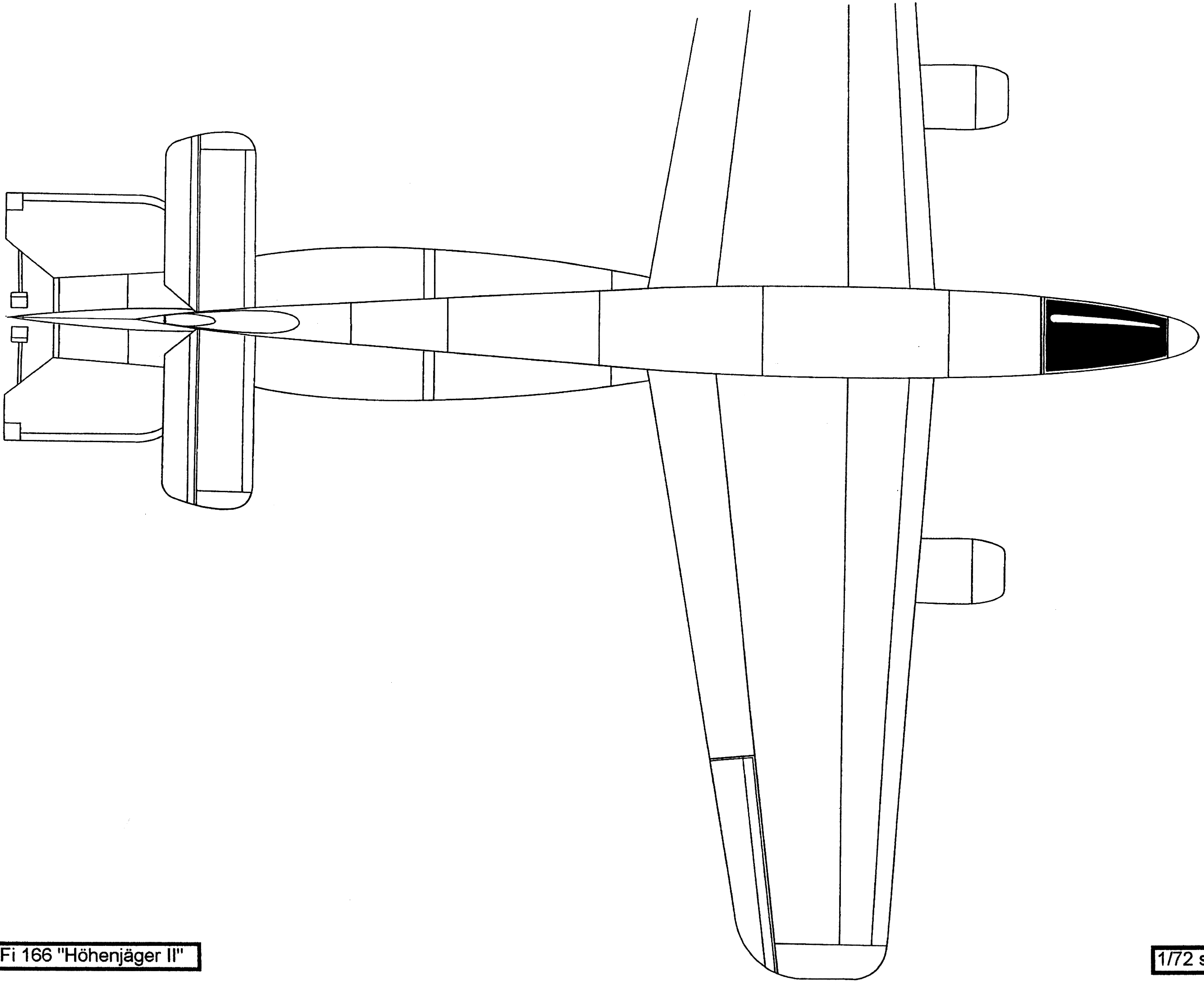
VTO rocket interceptor project designed by Erich Bachem, technical manager of the Fieseler Company. Although based on the technology developed by the von Braun team to power the V-2, it meant a big step back from the aerodynamic point of view seen as a classic straight wing airplane.

All the designs of the Interceptor series designed by von Braun, like the "Höhenjäger I" were rejected by the OKL due to its short range.

The "Höhenjäger II" was designed as a twin jet interceptor that used the V-2 power system to reach combat ceiling very fast. The design was aerodynamically lower to the Me 262 and was also discarded

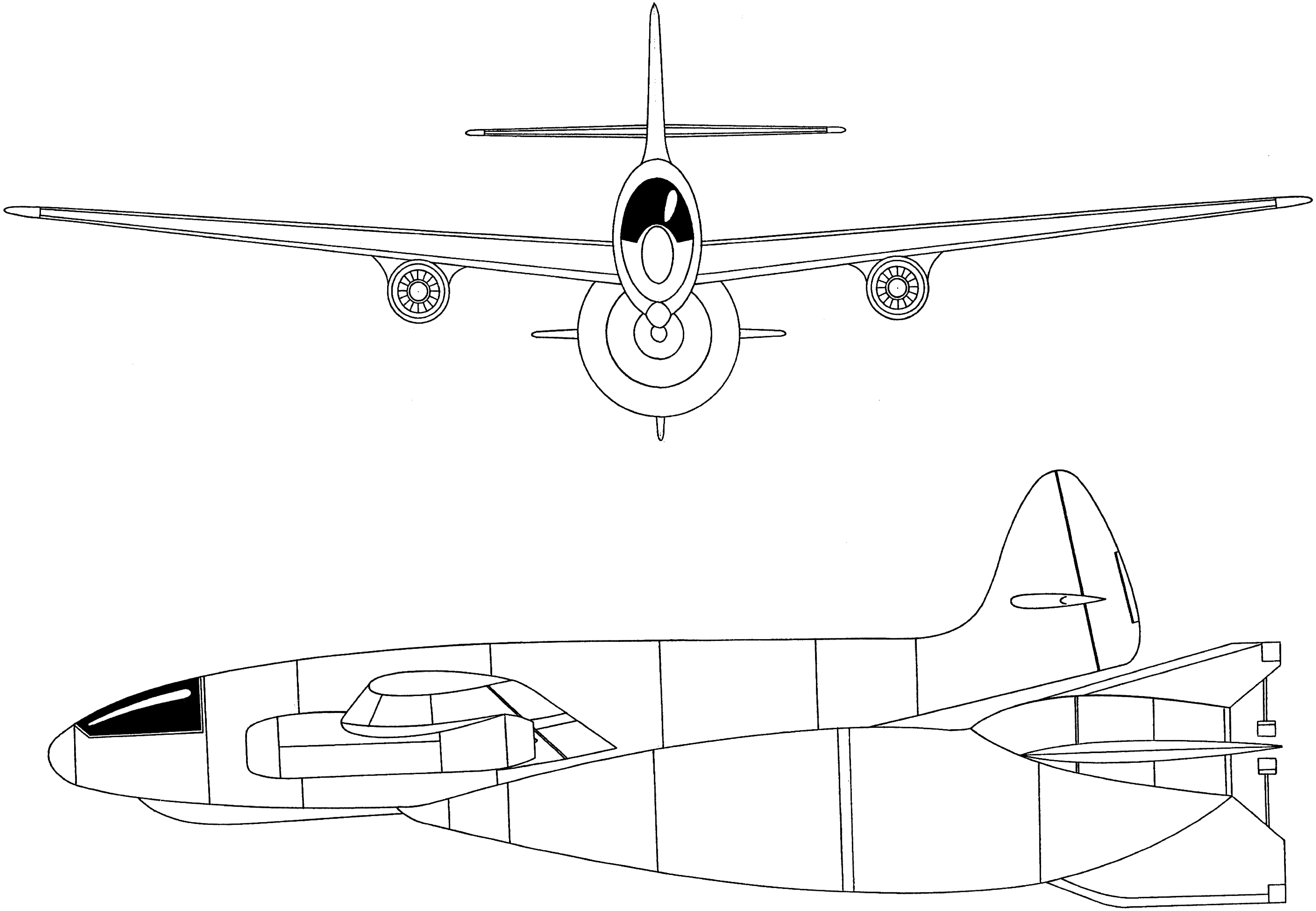
"Höhenjäger I" TECHNICAL DATA

Type	VTO rocket interceptor
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	One retractable skid
Engine	One EMW bifuel rocket with 27,500 kp static thrust
Fuel tanks	One of M-Stoff and two of A-Stoff for the rocket. One of T-Stoff and another of Z-Stoff for the turbo pump
Wingspan	15.6 m
Length	16.5 m.
Height	5 m.
Maximum weight	13,500 kg
Maximum speed	830 km/h
Ceiling	12,000 m
Range	45 min



Fieseler Fi 166 "Höhenjäger II"

1/72 scale

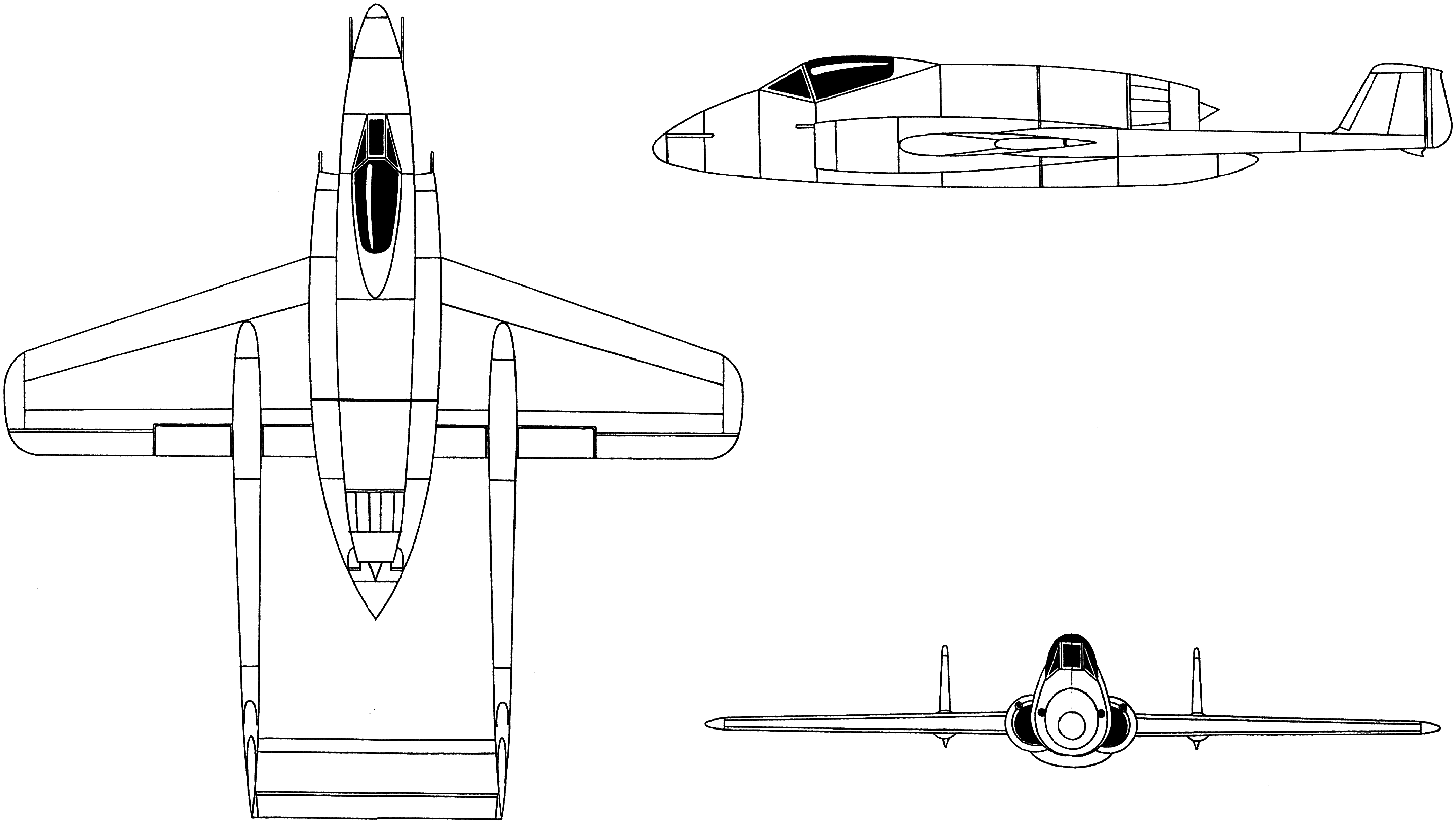


Fieseler Fi 166 "Höhenjäger II"

1/72 scale

“Höhenjäger II” TECHNICAL DATA

Type	VTO jet interceptor
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Tricycle type
Engine	One EMW bifuel detachable rocket with 27,500 kp static thrust plus two Jumo 004A turbojets with 830 kp static thrust each
Fuel tanks	One of M-Stoff and two of A-Stoff for the rocket. One of T-Stoff and another of Z-Stoff for the turbo pump. Two of J2 kerosene for the turbojets
Wingspan	17.2 m
Length	16.3 m.
Height	5.7 m.
Maximum weight	10,000 kg
Maximum speed	830 km/h
Ceiling	12,000 m
Range	45 min



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Focke Wulf PIV

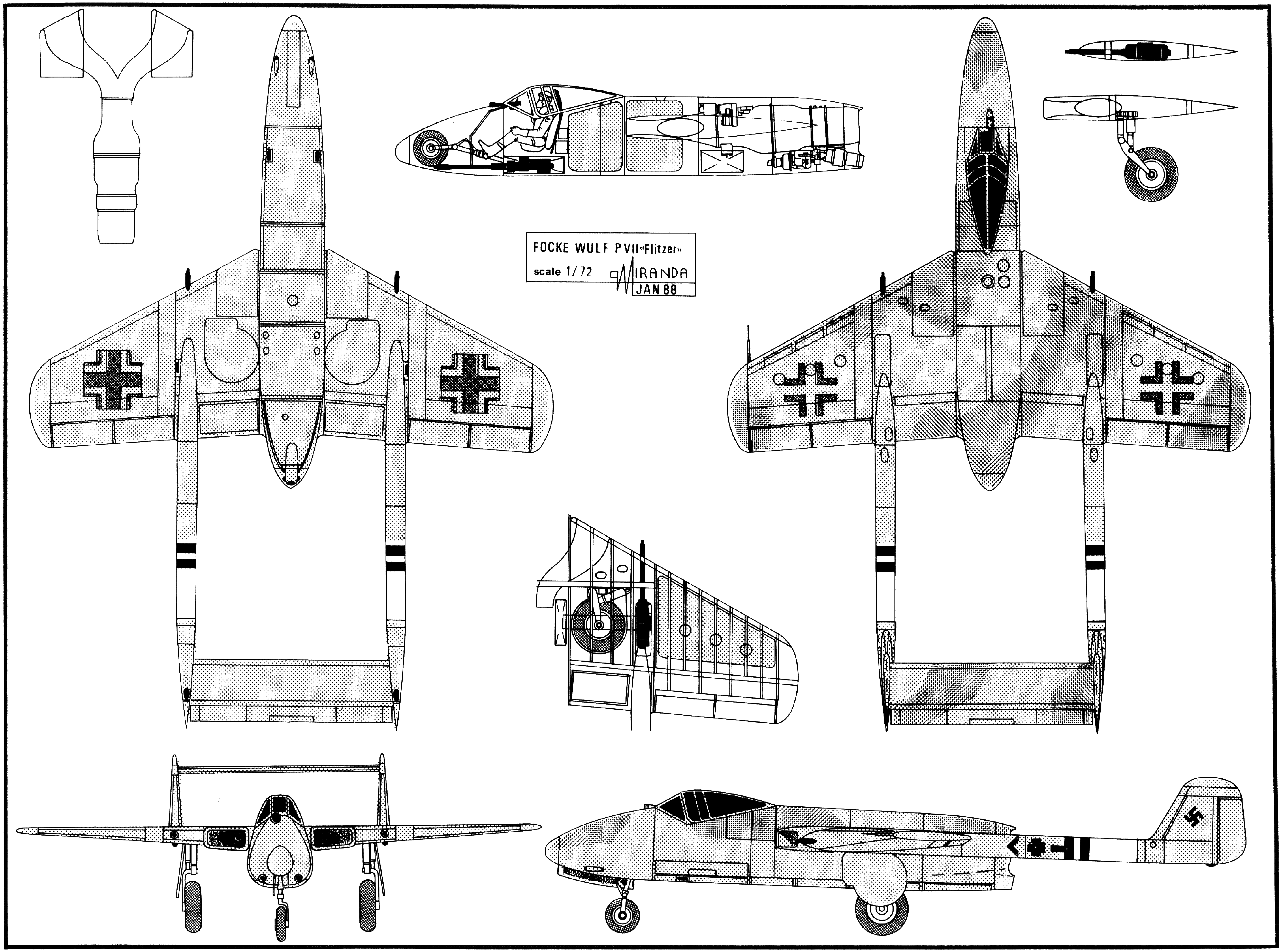
Focke Wulf PIV

Designed as an alternative to the PV by the same firm. To balance the lack of power of their Jumo 004 turbojet two bifuel Walter rockets were added.

Both the PIV and the PV were rejected by the OKL that required fighters exclusively powered by turbojets. The reason behind that being the bad experiences suffered with the Me 163 Komet and its dangerous propellants.

TECHNICAL DATA

Type	Air superiority mixed power fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Tricycle type
Engine	One Jumo 004 B turbojet with 890 kp static thrust plus two bifuel Walter 109-509 A1 rockets with 1.600 kp static thrust
Fuel tanks	Two of J2 kerosene, one of R-Stoff and another of Z-Stoff
Armament	Two MG 151/20 and two Mk 108/30
Wingspan	9 m
Length	9.7 m.
Height	2.1 m.



FOCKE WULF P VII «Flitzer»
scale 1/72
MIRANDA
JAN 88

Focke Wulf PVII "Flitzer"

Designed as an alternative to the Ta 183 by the same firm foreseeing the possibility that the aerodynamic solutions used to the latest were seen as too much advanced by the OKL.

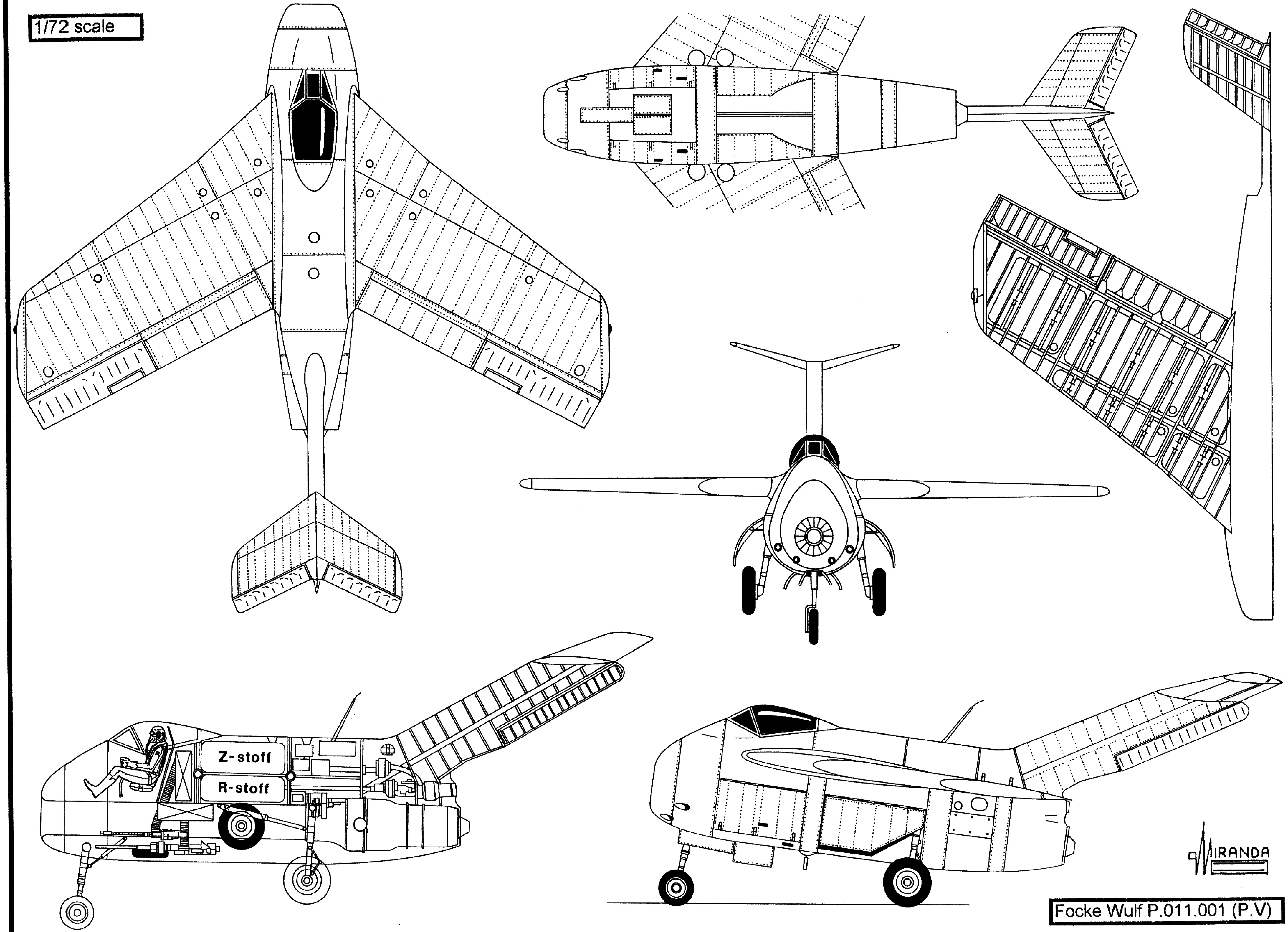
Derived from the PIV and the PVI, of similar shapes, the PVII was powered by a turbojet HeS 011of third generation.

Although faster than the British Vampire, its short wingspan did not offer good performances at high altitude. Therefore the manufacturer proposed the installation of a Walter rocket under the name HeS 011. Its construction was disregarded in favour of the Ta 183.

TECHNICAL DATA

Type	Air superiority mixed power fighter
Phase	Windtunnel model test
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Tricycle type
Engine	One HeS 011 turbojet with 1,300 kp static thrust plus one bifuel Walter 109-509 A1 rocket with 1.600 kp static thrust
Fuel tanks	Two in the fuselage and two in the wings
Armament	Two MG 151/20 and two Mk 108/30
Wingspan	8 m
Length	10.55 m.
Height	2.35 m.
Wing area	17 m^2
Maximum weight	4,820 kg
Maximum speed	925 km/h
Ceiling	13,800 m.
Range	1,100 Km

1/72 scale



Focke Wulf P.011.001 (P.V)

Focke Wulf P.011.001

Air superiority fighter project developed using the set of aerodynamic solutions known as "Plan V" in January 1944.
The first configuration P.011.001 (Plan V-Entwurf) was equipped with a HeS 011A turbojet and bifuel Walter HWK 109-509 A-2 rocket which provided a great operational flexibility. It could act as a point-defence interceptor (replacing with advantage the Komet and Natter) taking off with two engines, using full power to reach the combat ceiling within an unlikely time to attack the bombers with the 20 mm guns. Once the rocket propellants were exhausted, it could face the escort fighters with the MG17 machine guns with a great advantage of speed thanks to the turbojet.

It might also carry out CAP missions equipped with detachable tanks and using the extra speed of the rocket to reach the interception area in a very short time. Also, it could move away from a numerically superior enemy by climbing above the operational ceiling of the Allies fighters, beating the Me 262 that was not able to make it.
It was the first design of the firm in which the phenomena of compressibility buffeting, local transonic flux, air viscosity in the boundary layer and Mach critical number, defined by the aerodynamicists of the LFA in 1941, were taken into account.

To delay the appearance of vibrations, a frontal air intake and double sweep wing with a higher chord/thickness ratio in the tip were adopted that also served to delay the displacement of the pressure centre and the aileron reversement.
The use of a "T" tailplane avoided the effect of the turbulence generated by the joint of the wing and the fuselage to critical Mach numbers but it made the installation of an ejectable seat necessary. The tips of the surface controls were clipped to facilitate manoeuvrability at high speed.

The Tank-Multhopp team had a winner in this airplane able to easily reach the 1,000 km/h in horizontal flight, fighting at any height and speed without losing control. However, it was a victim of the Luftwaffe criticism who have had very bad experiences with the Komet and its dangerous propellants. They argued that the next fighter should be propelled only by a turbojet.

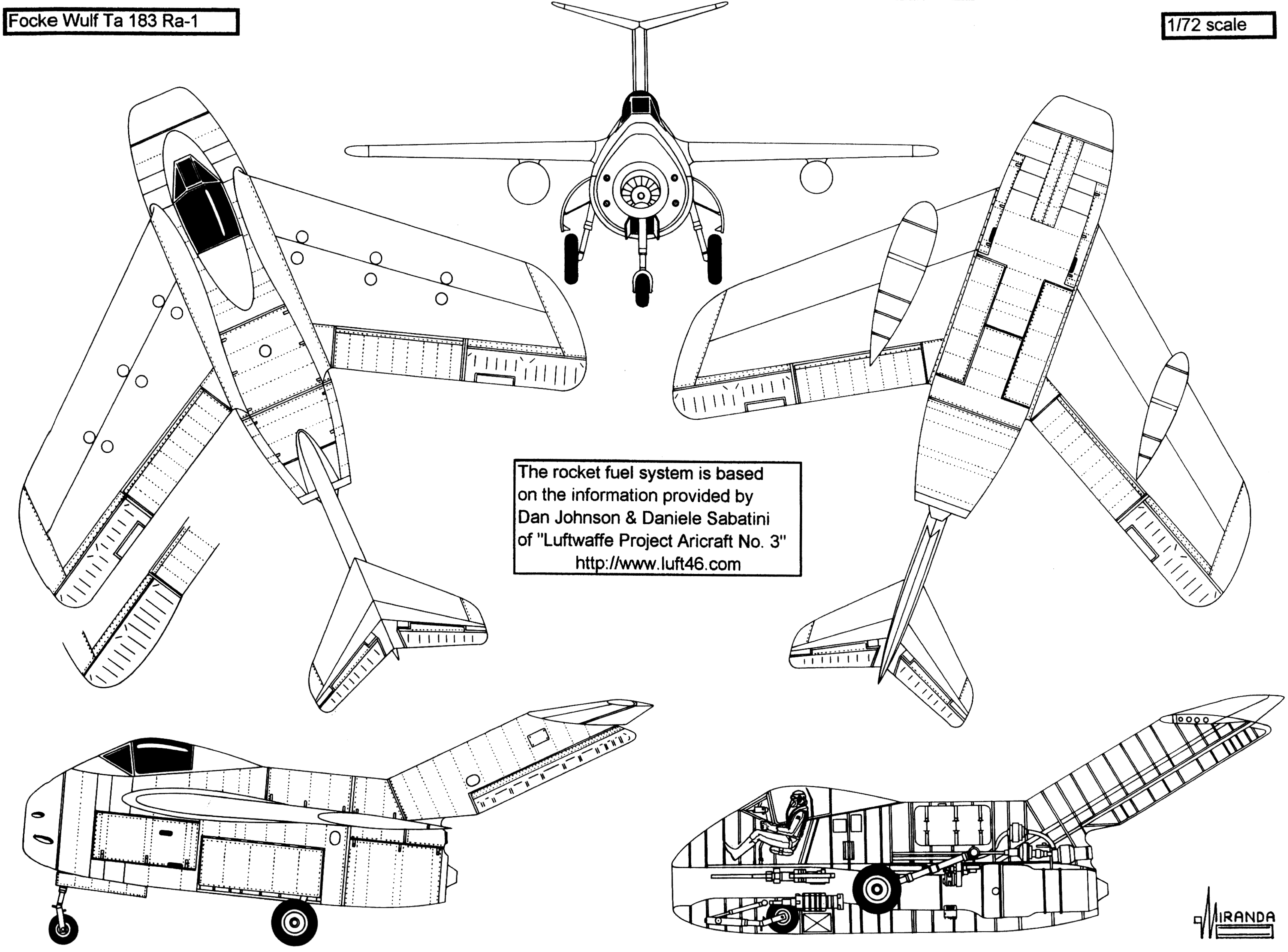
TECHNICAL DATA

Type	Air superiority fighter
Wings	Double sweep 43/37°, 9 to 13% thickness. Metallic structure and cladding
Tail surfaces	38° sweep, metallic structure and cladding, tailfin 60° sweep
Fuselage	Egg section, metallic structure and cladding. Pressurised cockpit. Armoured seat and windshield. Ejectable seat,
Landing gear	Tricycle type. The main wheels were retractable forward and were housed to both sides of the air duct. The nose wheel was retractable backward after rotating 90°
Engine	One HeS 011R formed by a HeS 011A turbojet with 1,600 kp static thrust and bifuel Walter HWK 109-509 A-2 rocket with 1,700 kp static thrust
Fuel tanks	One of Z-Stoff of 800 lt. and another of R-Stoff of 1,800 lt. in the fuselage and ten tanks of kerosene in the wings with a total capacity of 1,400 lt
Armament	Two MG 151/20 and two MG 17 machine guns

Measures	**Span:** 8.7 m. **Length:** 8.9 m. **Height:** 3.4 m. **Wing: surface:** 18 m^2
Maximum speed (dive)	Transonic
Maximum speed (level)	1,000 km/h
Service ceiling	11,600 m.
Rocket endurance	3.5 min.

Focke Wulf Ta 183 Ra-1

1/72 scale



The rocket fuel system is based
on the information provided by
Dan Johnson & Daniele Sabatini
of "Luftwaffe Project Aricraft No. 3"
http://www.luft46.com

MIRANDA

Fw Ta 183

The Ra-1 (January 1945) was a project of an air-superiority fighter based on the P.011.001
It was to be propelled by a mixed HeS 011R powerplant formed by a HeS 011A turbojet and bifuel Walter rocket with fuel-pumps actioned by the turbojet by means of a power shaft.
In an attempt to avoid the Jägernottprogramm specification of the Luftwaffe, the 350 lt of T-Stoff and the 180 lt. of C-Stoff were assymetrically housed under the wings in drop fuel tanks of different shapes.
The 950 kg of rocket fuel, enough for making it work during 200 seconds, were used for the takeoff and climbing just to the combat ceiling of 12,000 m in the shortest possible time.

TECHNICAL DATA

Type	Single seat jet fighter
Wings	Steel spar. Wooden structure and cladding, 40° sweep
Fuselage	Metallic structure and cladding. Pressurised cockpit. Armoured seat and windshield. Ejectable seat. EZ 42 Adler Gunsight.
Empennages	Metallic structure and cladding for the tailfin. Wooden structure and cladding for the tailplane
Landing gear	Tricycle type. The main wheels were retractable forward and housed to both sides of the air duct. The nosewheel was retractable backwards.
Engine	One HeS 011 R formed by a HeS 011A turbojet with 1300 kp. and bifuel Walter HWK 109.509 A-2 rocket with 1,700 kp
Fuel tanks	Twelve tanks in the wings with a total capacity of 1,220 lt. It could carry two drop tanks of T-Stoff and C-Stoff of 350 lt and 180 lt each.
Armament	Two MG 151/20 and two Mk 108/30,
Measures	**Span**: 8.64 m **Length**: 8.9 m **Height**: 3.5 m **Wing area**: 17
Weight load	4,100 kg
Maxi. speed	1,092 km/h
Ceiling	12,000 m
Range	757 km

Focke Wulf Ta 283

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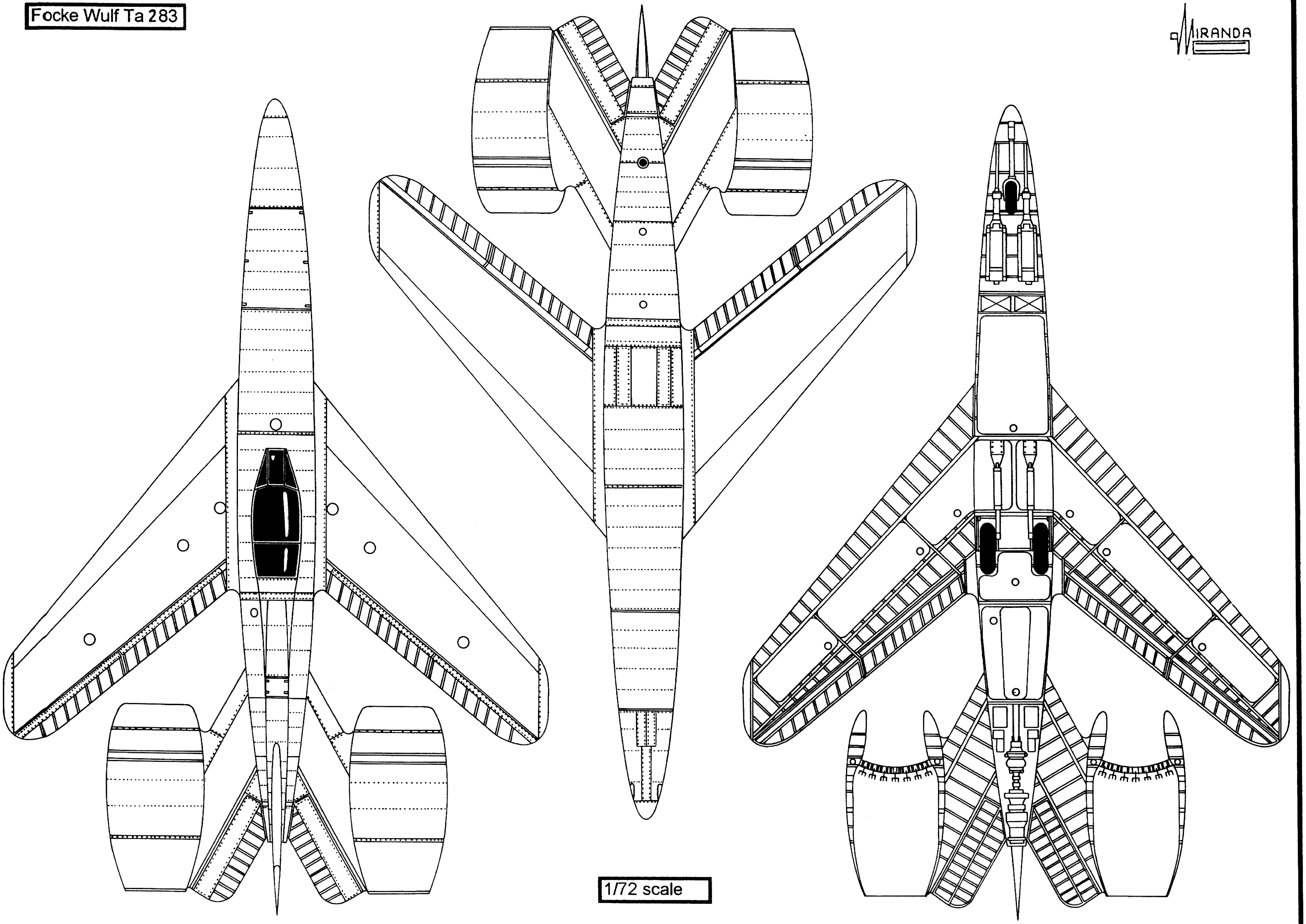

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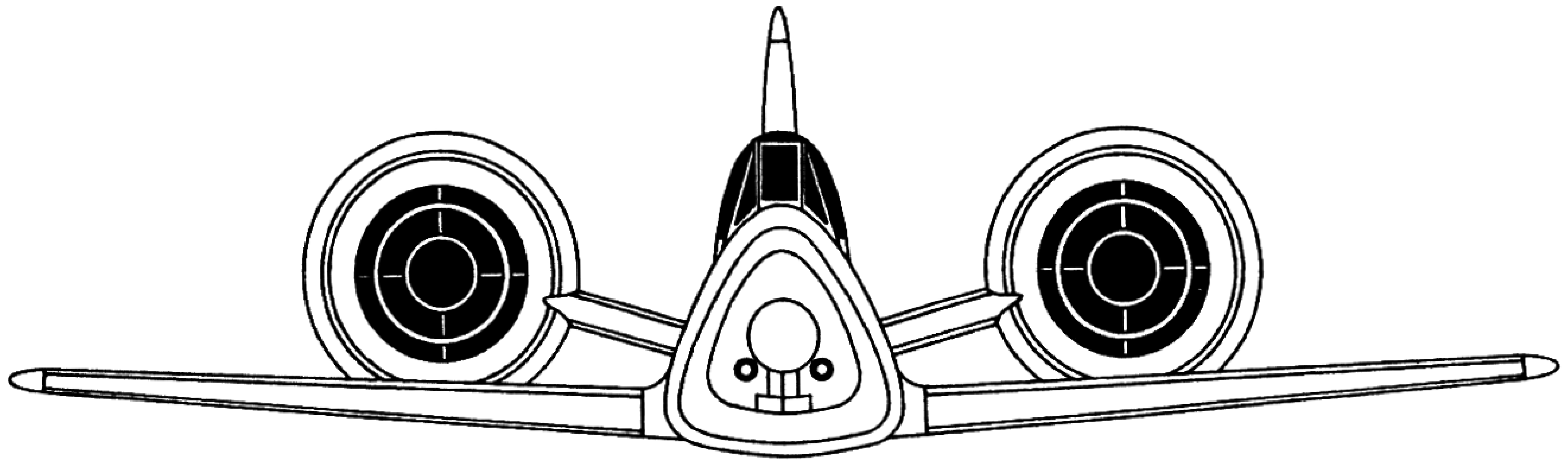
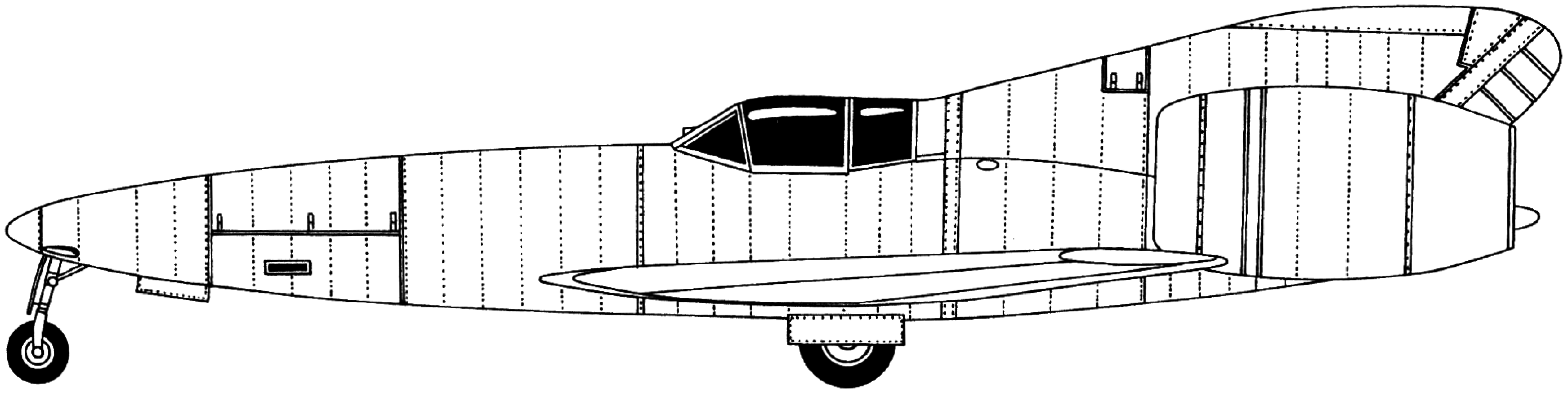
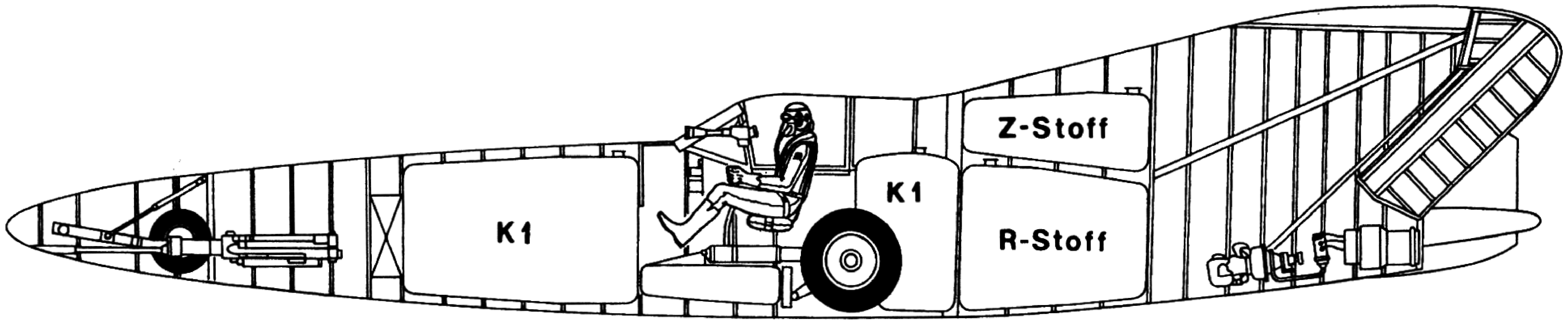
Focke Wulf Ta 283







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MIRANDA

Focke Wulf Ta 283

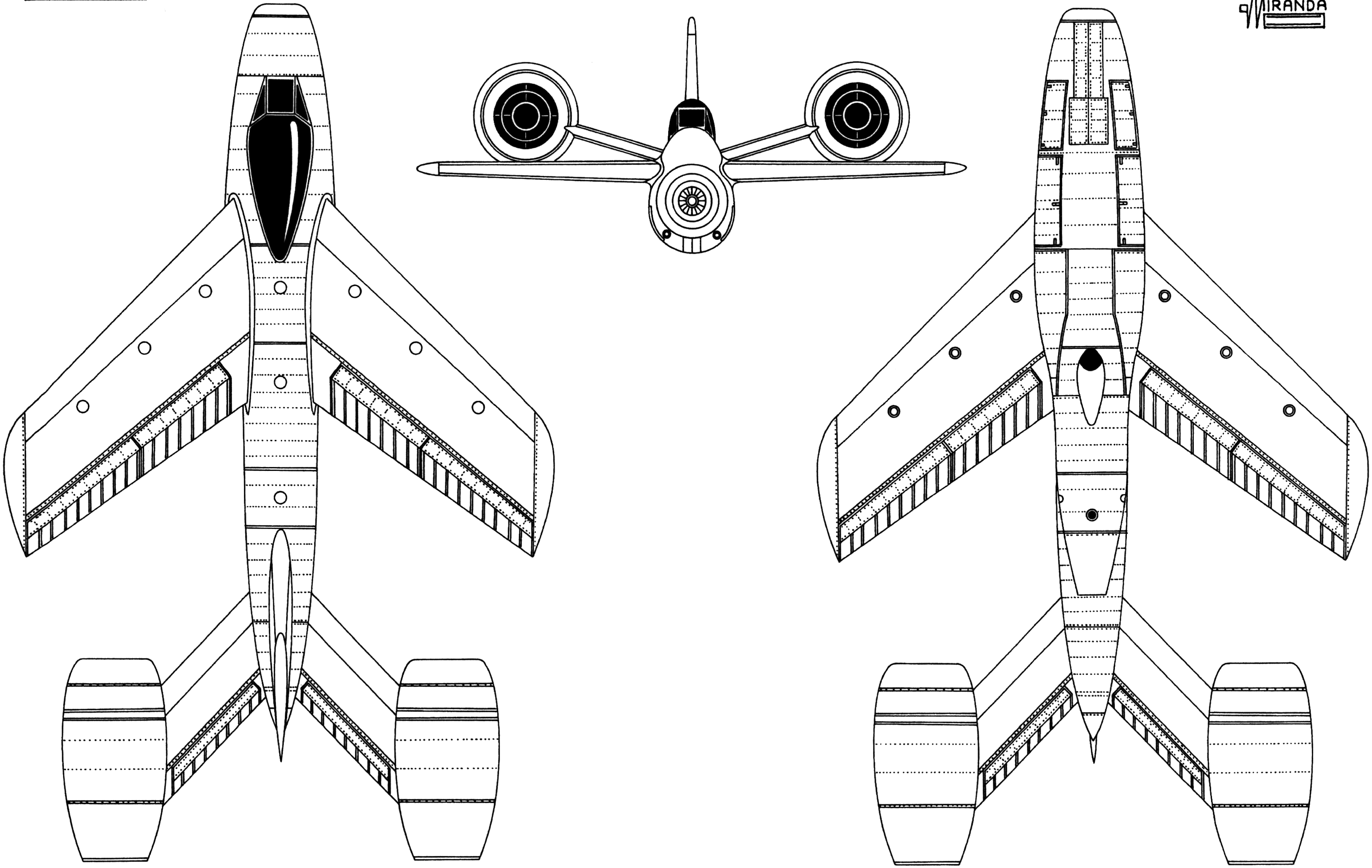
Based on the studies by Eugen Sänger, the Focke Wulf firm developed a ramjet engine named "Super Lorin" at the beginning of 1944. This engine had the particularity of being much shorter than the Sänger and Lippisch models.

It was used in three designs of fighters; the Fw Triebflügel VTOL with rotating wings (15 September 1944), the Fw "Super Lorin" and the Ta 283 (4 August 1944). The lattest was propelled by two ramjets. Each of them would have developed a titanic 10,850 hp at sea level and 2,270 hp at 36,000 ft.

It also used a Walter auxiliary rocket for take off, for reaching the ignition speed of the ramjets and for climbing again in case of a missed landing approach.

TECHNICAL DATA

Type	Ramjet-powered interceptor
Wings	Wooden structure and cladding, 50° sweep
Tail surfaces	Wooden structure and cladding, 60° sweep
Fuselage	Metallic structure and cladding. Pressurised cockpit. Armoured seat and windshield. Ejectable seat. IR device FuG 280 "Kiel Z".
Landing gear	Tricycle type. The main wheels were retractable. Retractable backwards on both sides of the pilot. The nose wheel was retractable backwards
Engine	Two Lorin Ramjets of 10,850 hp each and a Walter HWK 109-509 A-2
Fuel tanks	Two K1 tanks of 1,400 and 405 lt, one of Z-Stoff of 163 lt and another of R-Stoff of 960 lt. In the wings, two K1 tanks of 325 lt
Armament	Two Mk 103/30
Measures	**Span**: 8m **Length**: 11.85 m **Height**: 2.9, **Wing area**: 19 m^2
Weight loaded	5,388 kg
Maximum speed	1,125 km/h
Service ceiling	11,000 m
Range	690 km



Focke Wulf Fw 250 (Super-Lorin)

Focke Wulf Fw 250 (Super-Lorin)

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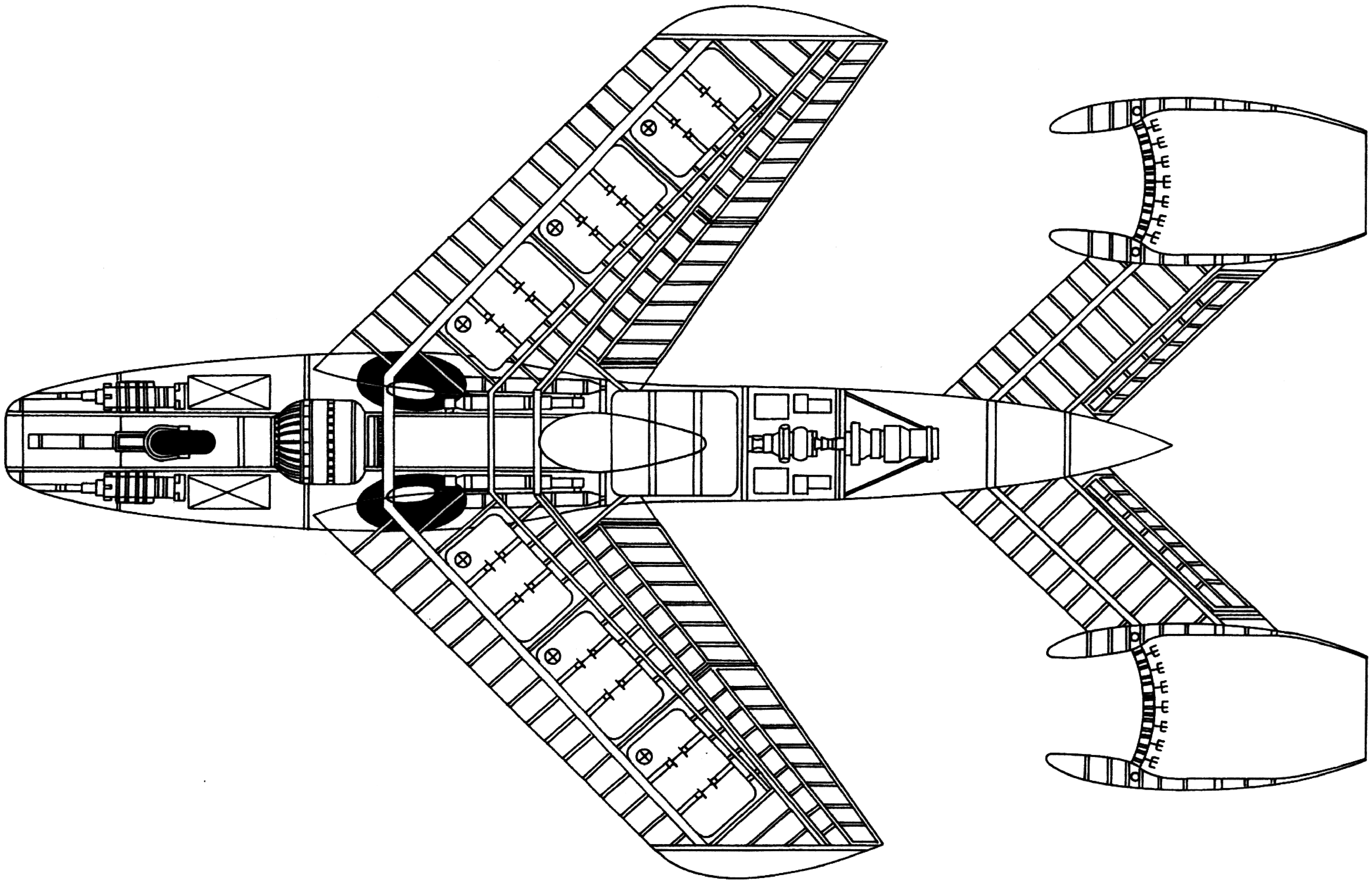
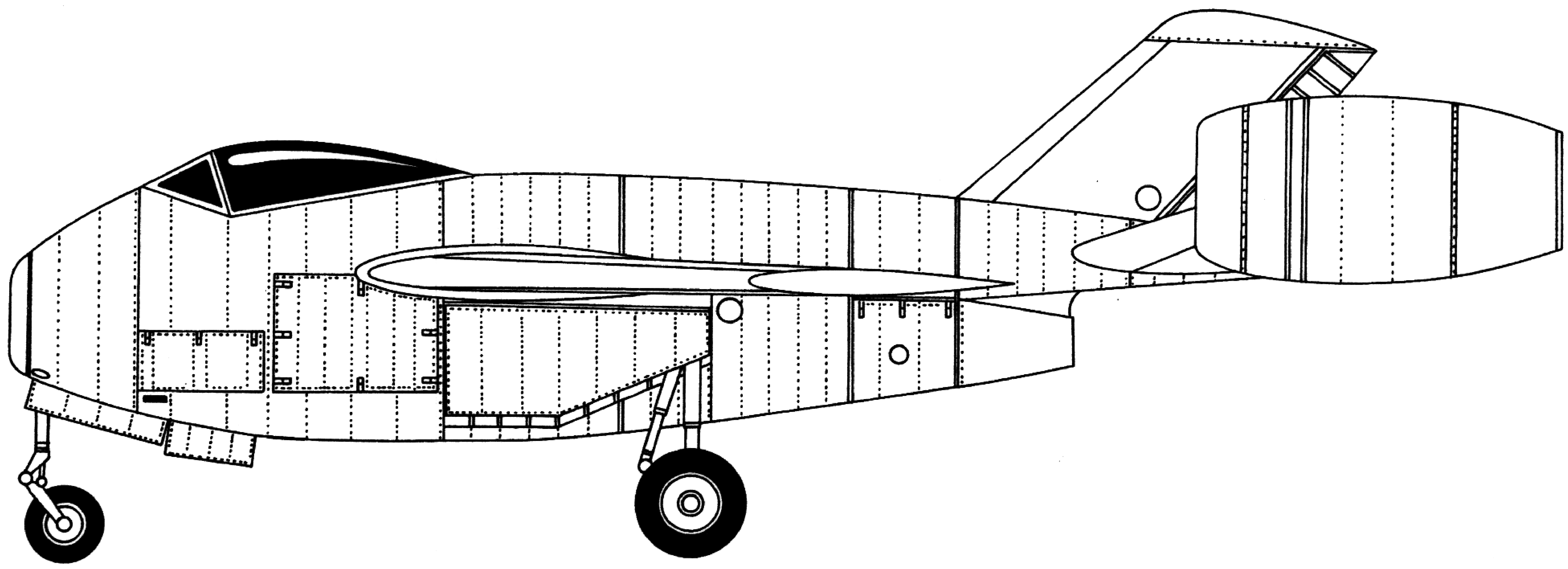
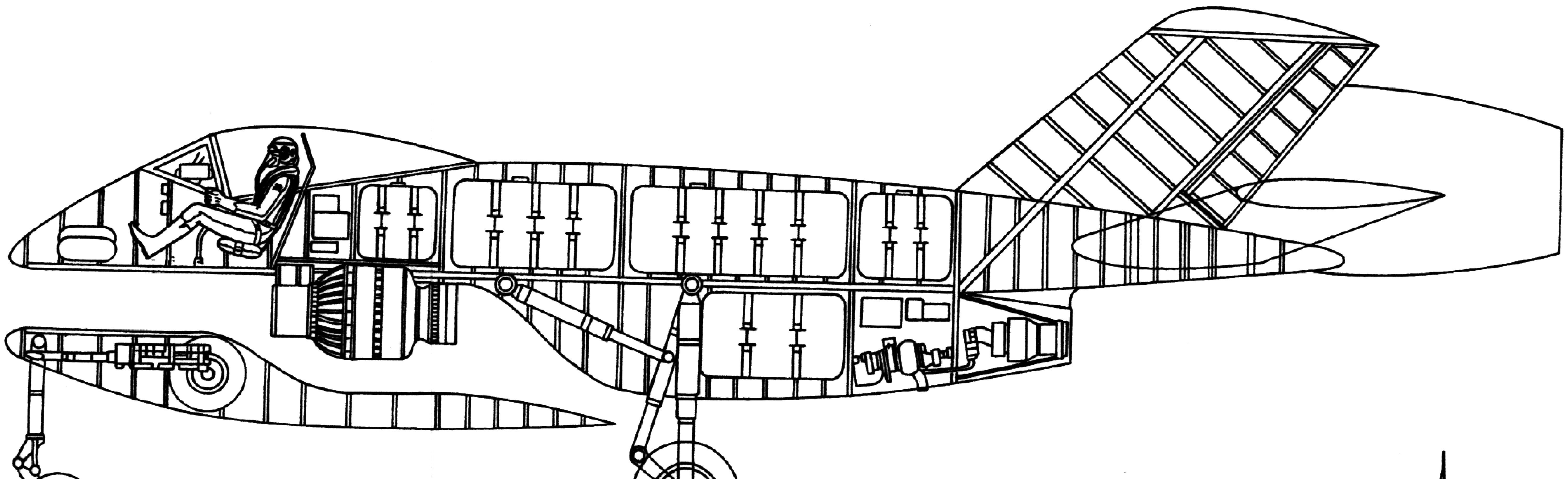






MIRANDA

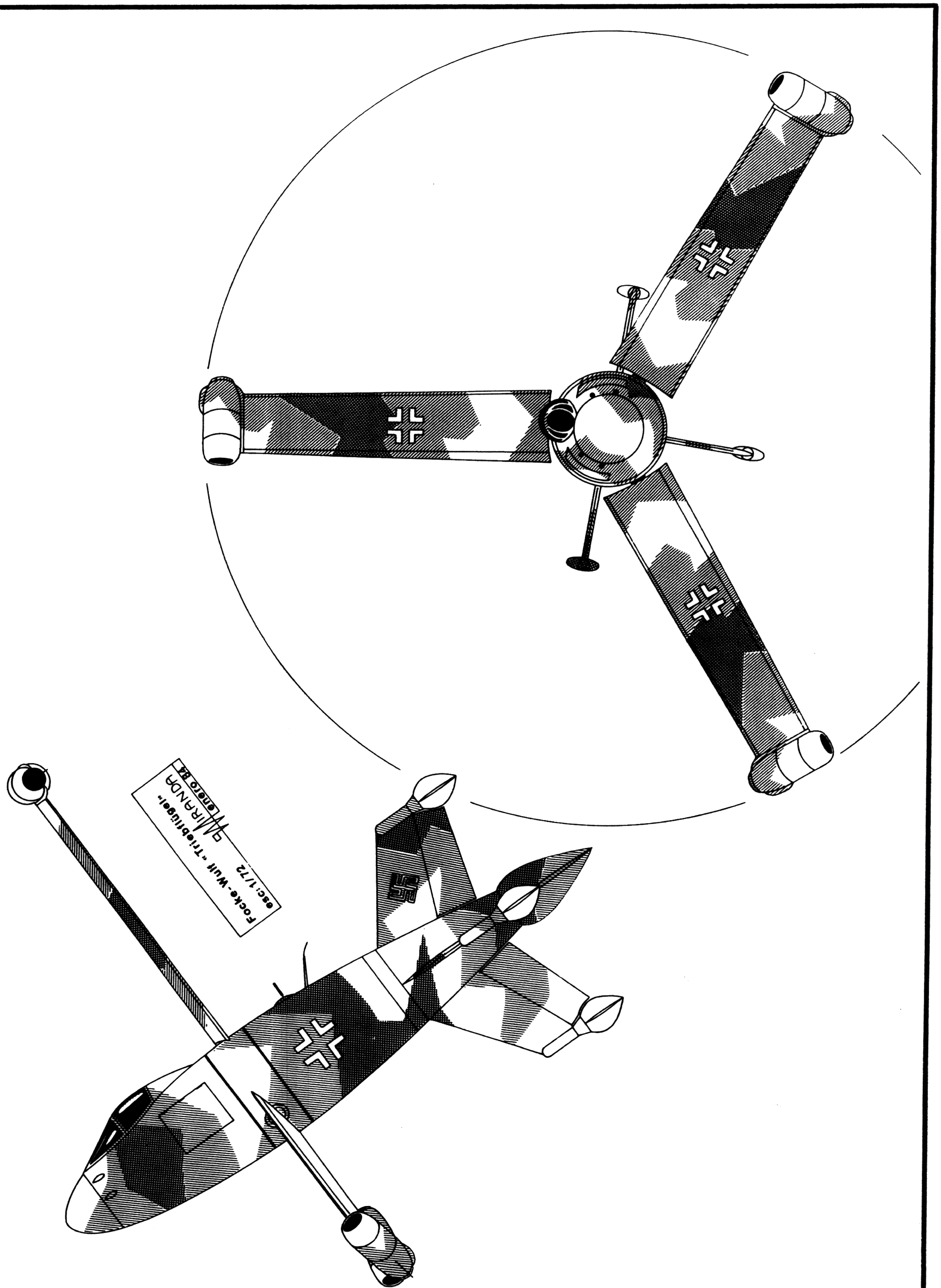
Focke Wulf Fw 252 "Super Lorin"

The Ta 283 was rejected in the Autumn of 1944 due to three reasons; it had not such good performances at a great height, the flight duration was too short and the rocket lasted just 33 seconds.
To solve these problems, Dr Von Halem's team proposed a version of the Fw 252 "Super TL" adapted to the use of the ramjet engine.

The Walter rocket was still being used with a fuel capacity increased to 55 seconds and with the installation of a small turbojet of 720 kp. The exhaust nozzle was located on the aircraft belly with the purpose to generate an STOL thrust during take off and landing.
The performances at high altitude could also be improved and the span shortened making the airplane very fast at lower height where the ramjets could produce the maximum thrust.

TECHNICAL DATA

Type	Ramjet-powered interceptor
Wings	Wooden structure and cladding, 45° sweep
Tail surfaces	Wooden structure and cladding, 45° sweep
Fuselage	Metallic structure and cladding. Pressurised cockpit. Armoured seat and windshield. Ejectable seat
Landing gear	Tricycle type. The main wheels were retractable forward and were housed to both sides of the air duct. The nose wheel was retractable backwards
Engine	One HeS 8 turbojet of 720 kp, two Lorin Ramjets of 10,850 hp each and a bifuel Walter HWK 109-509 A-2 rocket with 1,700 kp static thrust
Fuel tanks	Three kerosene K1 tanks of 270, 650 and 845 lt each, one of Z-Stoff of 345 lt and another of R-Stoff of 575 lt. in the fuselage Six K1 tanks of 150 lt each in the wings.
Armament	Two Mk 108/30 guns in the nose.
Measures	**Span**: 7.6 m **Length**: 11.6 m **Height**: 4.1 m **Wing area**: 15 m^2


Focke-Wulf «Triebflügel»
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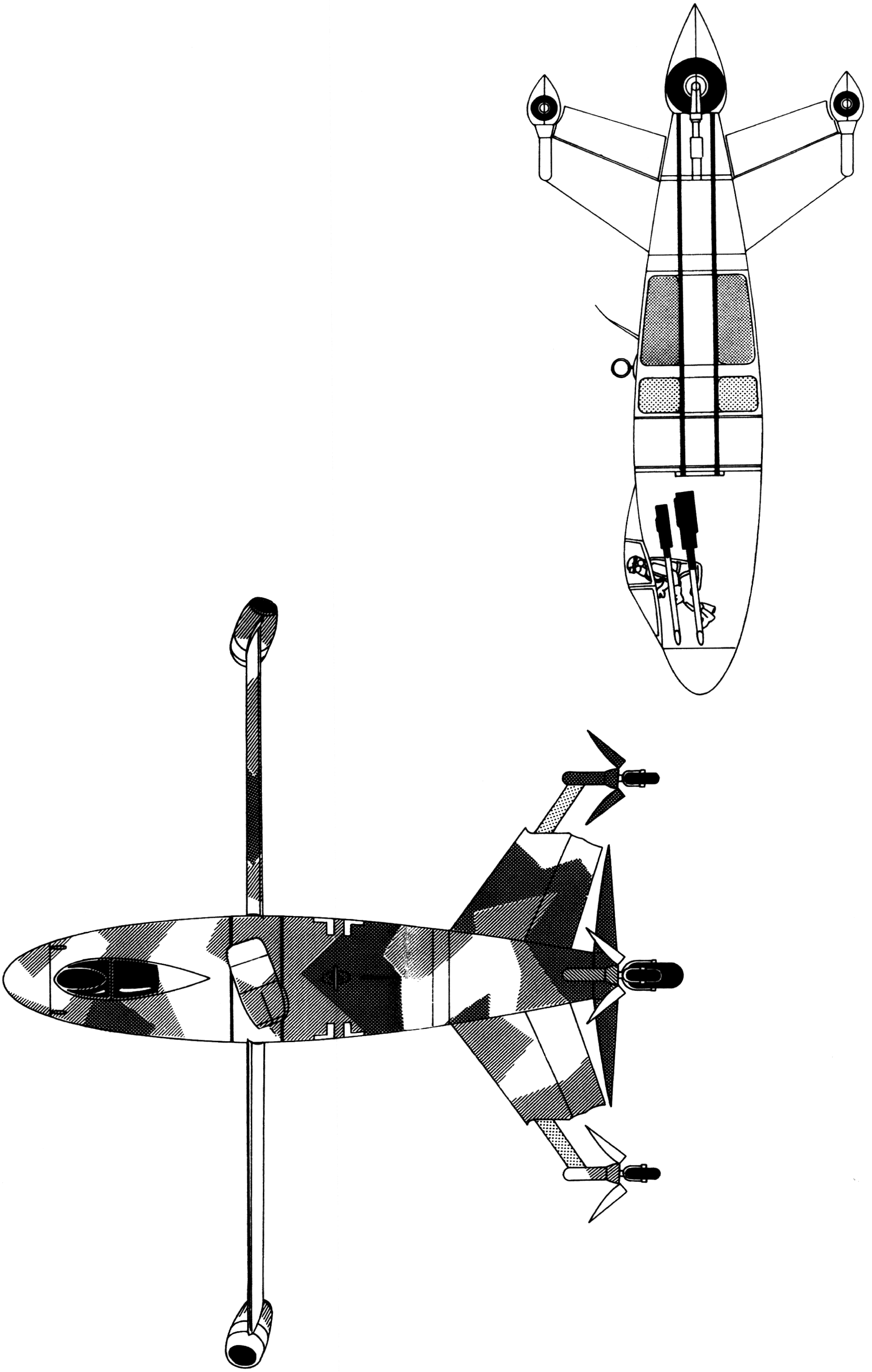


FOCKE WULF "TRIEBFLÜGEL"

During the final phase of the war, Germany lacked aircraft fuel and every air base was suffering the constant harassing of the allied tactical aviation, to the point of being almost impossible to operate any aircraft from them. The Luftwaffe needed a vertical takeoff and landing fighter able to operate from the woods, like the V-2 already did.

Different VTOL designs wee produced, powered by conventional engines, turbojets and rockets. However, all of them had the disgusting habit of consuming expensive and exotic propellants. Obviously, the devastated German chemical industry was not able to supply them on a regular basis.

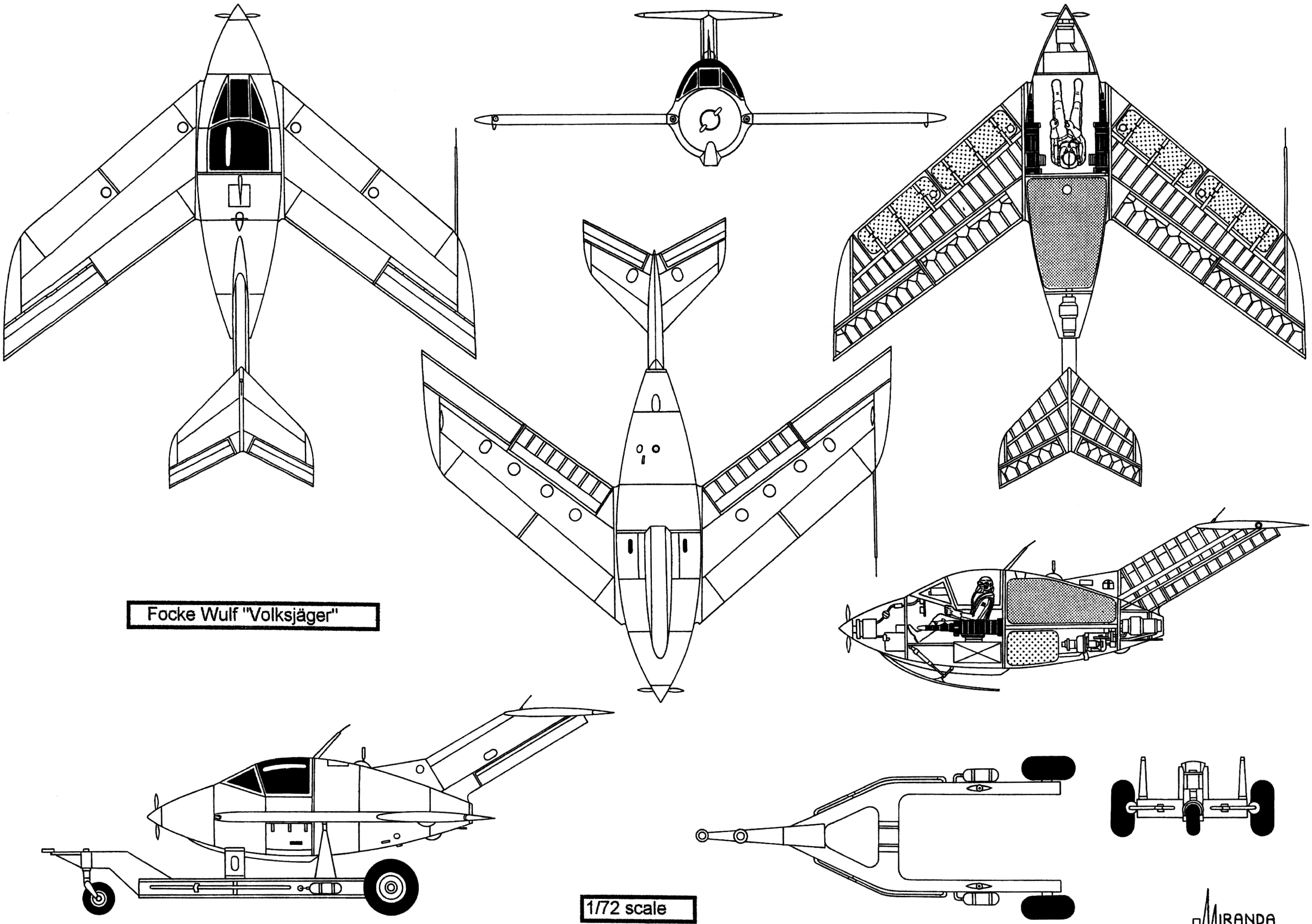
On the other hand, the V-1 flying bombs flew perfectly well powered by the primitive Argus pulsejets, burning low quality fuel.
Different test performed under the "Miniaturjäger" program gave the confirmation that this type of engines were not the right ones for the fighters. They did not work well at high altitude. They had a fixed power output that could not be increased or decreased in flight by means of a throttle.

The Focke Wulf company was the only one to continue working on an idea by Dr. PabSt, chief of the Dynamic Of Gases team. It was a shorter engine than the Argus, able of a flawless performance without any destructive vibration, provided that the forward air intake could admit air at a high speed.
There were two different ways to achieve that. A conventional airplane that took off by means of rockets and an airplane fitted with a rotary wing able to reach ignition speed while the whole machine was still on the runway.
The wing, powered by three Walter rockets, reached the starting speed of the ramjets, a certain leading angle was given to it (with a device similar to the one used by the variable pitch propellers) and the fighter took off.

The project was named "Triebflügel" (Miracle Fighter)
Although the design never passed the stability tests performed at the Braunschweig wind tunnel, they went on working on the concept with scale models until the end of the war.

TECHNICAL DATA

Type	VTOL fighter
Phase	Project
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding
Landing gear	Five legs retractable device
Engine	Three Lorin ramjet engines of 1,850 lb. thrust each plus three bi-fuel Walter rockets
Fuel tanks	One of petrol, one of T-Stoff and another of C-Stoff in the fuselage
Armament	1 MK 103/30 and 2 MG 151/20 guns
Wingspan	(rotor diameter) 10.7 m
Length	9.2 m.
Height	9.2 m.
Wing area	16 m^2
Maximum weight	5,300 kg.
Maximum speed	990 km/h
Ceiling	14,000 m.
Range	500 km.



Focke Wulf "Volksjäger"

1/72 scale

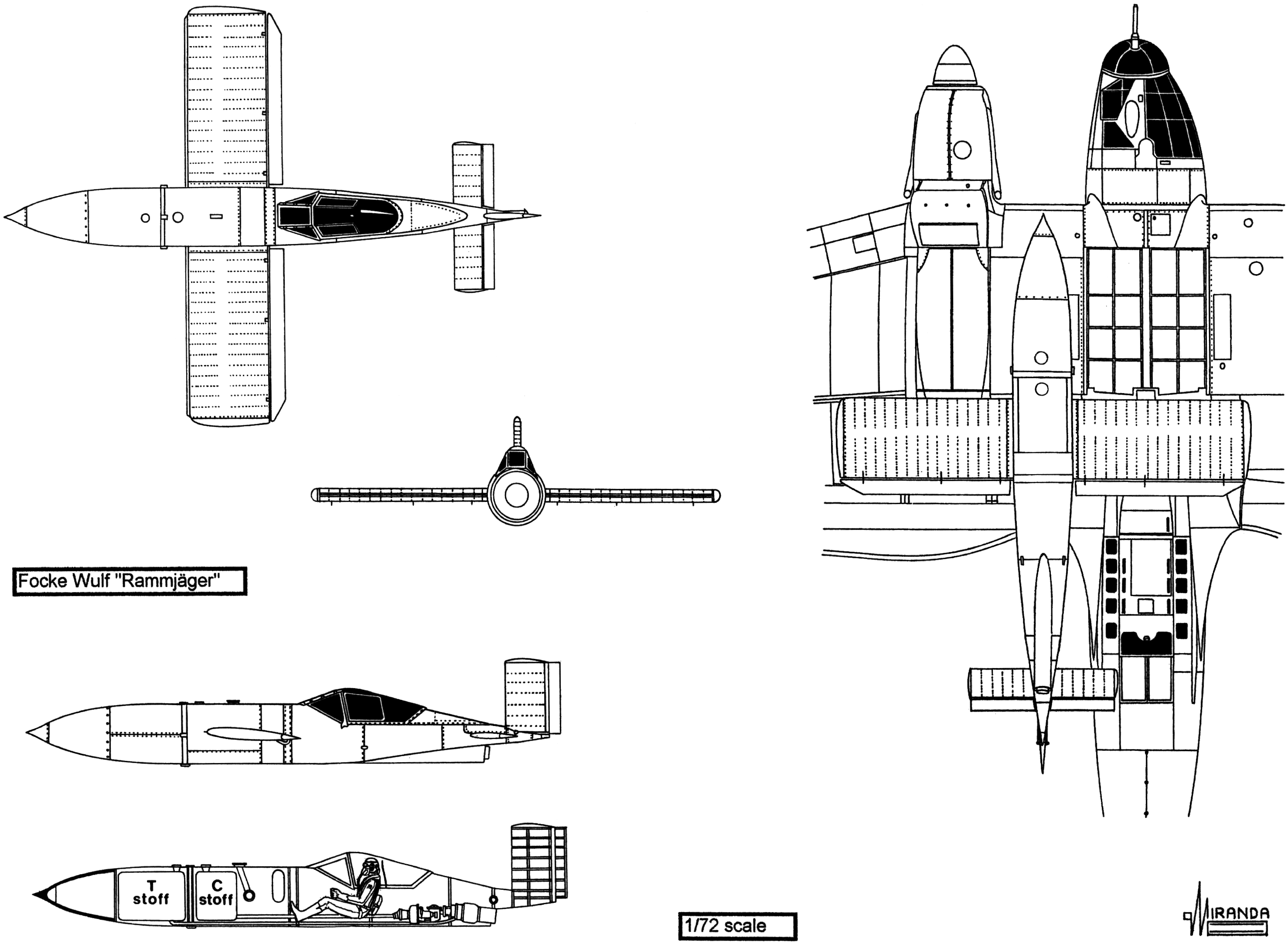
FOCKE WULF “VOLKSJÄGER”

Designed to compete against the Me 163, it was based on the aerodynamic research performed for the Fw Ta 183, of which the “Volksjäger” had become a reduced version propelled by rockets.

Like the Heinkel “Julia”, it was launched from a ramp and landed on a retractable skid..

TECHNICAL DATA

Type	Target defence interceptor
Phase	Design
Wings	Wood structure and cladding.
Fuselage	Metallic structure and cladding
Landing gear	A retractable skid under the fuselage
Engine	A Walter HWK 109-509 A-2 with 1,700 kg of thrust
Armament	Two MK 108 guns of 30 mm at the wings roots
Fuel Tanks	One of Z-Stoff and another of R-Stoff in the fuselage. Four of Z-Stoff in the wings
Wingspan	6.77 m
Length	6.77 m
Height	2.20 m
Wing area	10 m^2
Maximum weight	2,133 Kg
Maximum speed	1,000 km/h
Ceiling	6,000 m
Range	6 min.



Focke Wulf "Rammjäger"

1/72 scale

Focke Wulf "Rammjäger"

The mass production of the flying bombs V-1 (Fi 103), entrusted to the Fieseler and Volkswagen firms,. was expected to be of 2,000 units in December 1943, 6,000 units in May 1944 and 9,000 units in September 1944. It was soon made evident that, even having the highest political priority, the production capacity of both firms in their factories at Fallersleben, Montagewerk Meissen, Montagewerk Cham, Kassel, Kassel.Rothwesten, Wolfsburg and Mittelwerke-Dora would not be enough to achieve the forecasted figures of production.

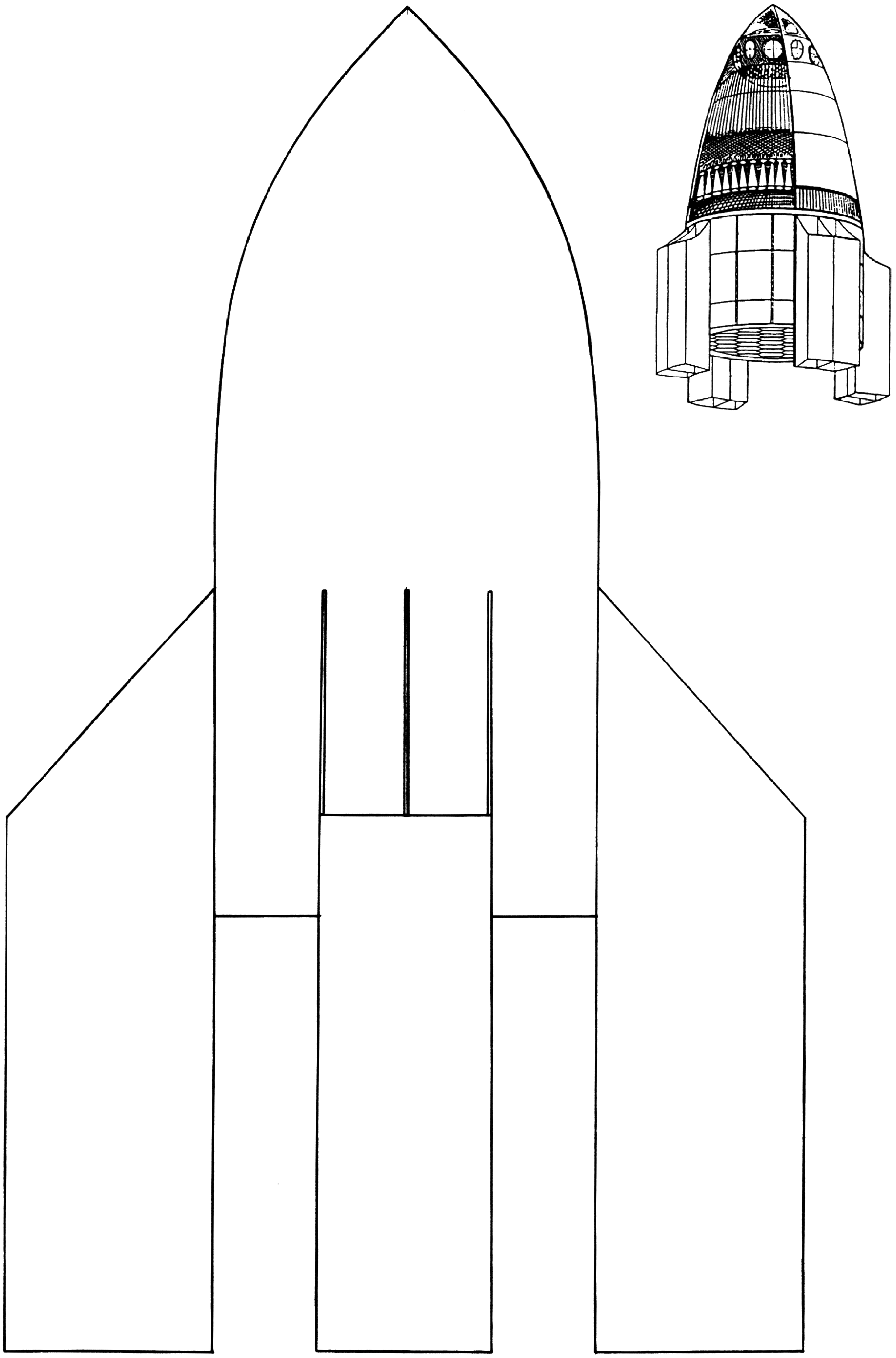
These circumstances could not be ignored by the rest of the aeronautical firms of the Reich that rushed to present their own projects based on the V-1.
Arado, DFS, Heinkel, Blohm und Voss, Gotha, Messerschmitt, Zeppelin and Henschel designed fighters based on the V-1

Nothing was known of the projects presented by the Focke Wulf company until the French historian Paul Malmassari published his remarkable article in "Le Fana de l'Aviation" (September 2000).
He describes a "Rammer" design proposed by Profesor Conradis of the Bad Eilsen factory in September 1944. The plan was to install an armoured nose instead of the warhead of a V-1, a pilot cockpit with an armoured windshield and an ejectable seat in the space usually taken by the compressed air bottles.
A bi-fuel Walter rocket replaced the Argus pulse jet that was not right for the high altitude flight..
It was foreseen that the Rammer would be launched from another airplane (possibly a He 111) to save rocket propellants. There are no drawings of this project.
We have therefore taken license to reconstruct this design based on Malmassari's description with the warning that any error should be credited to us, not to him.

Some V-1 carried cable-cutters in the leading edge of the wings, possibly also a useful device in the Rammer. We do not know about the type of seat used, except that the Focke Wulf firm had carried over some experiments with an ejectable seat installed in a Fw 190, with a special type of explosives.
As for Malmassari's story the ejection happened after the impact. This suggests an anti-G system installed in the seat, as in the British projects, for the Rammer version of the Spitfire in 1940. It is also difficult to eject with outstretched legs within the narrow fuselage of a V-1. Perhaps the seat had to move backwards before the ejection or perhaps the whole rear area should tear off as in the Me 328....What if?

TECHNICAL DATA (Estimated)

Type	Single seat rammer interceptor
Wings	Metallic structure and cladding
Tail surfaces	Metallic structure and cladding
Fuselage	Armoured nosecone, windshield, canopy and seat. Ejectable seat, oxygen supply, telephone link with the carrier plane, anemometer, altimeter, turn and bank gauge and chronometer.
Landing gear	None
Engine	Walter HWK 109-509 A-2 rocket
Propellant tanks	One of R-Stoff of 300 lt. and another of Z-Stoff of 180 lt. **Z-Stoff**, watery solution of sodium or calcium as a catalyst for the T-Stoff **R-Stoff** (Tonka 250), weighted mixture of xylidine (50%) and triethylamine (50%)
Armament	None
Measures	**Span:** 5.8 m. **Length:** 7.5 m. **Height:** 1.4 m. **Wing: surface:** 6.25 m^2
Launch weight	2,150 kg..



1/72 scale

«Frau im Mond»

"Frau im Mond" Lunar rocket

Spaceship designed in 1928 by the physicist Hermann Oberth for the film with that title.

It was a two stages rocket with a height of 35 m. and a diameter of 10 m. in the original version (Model E) that was afterwards redesigned in a 17x7 m. version and named "Luna".

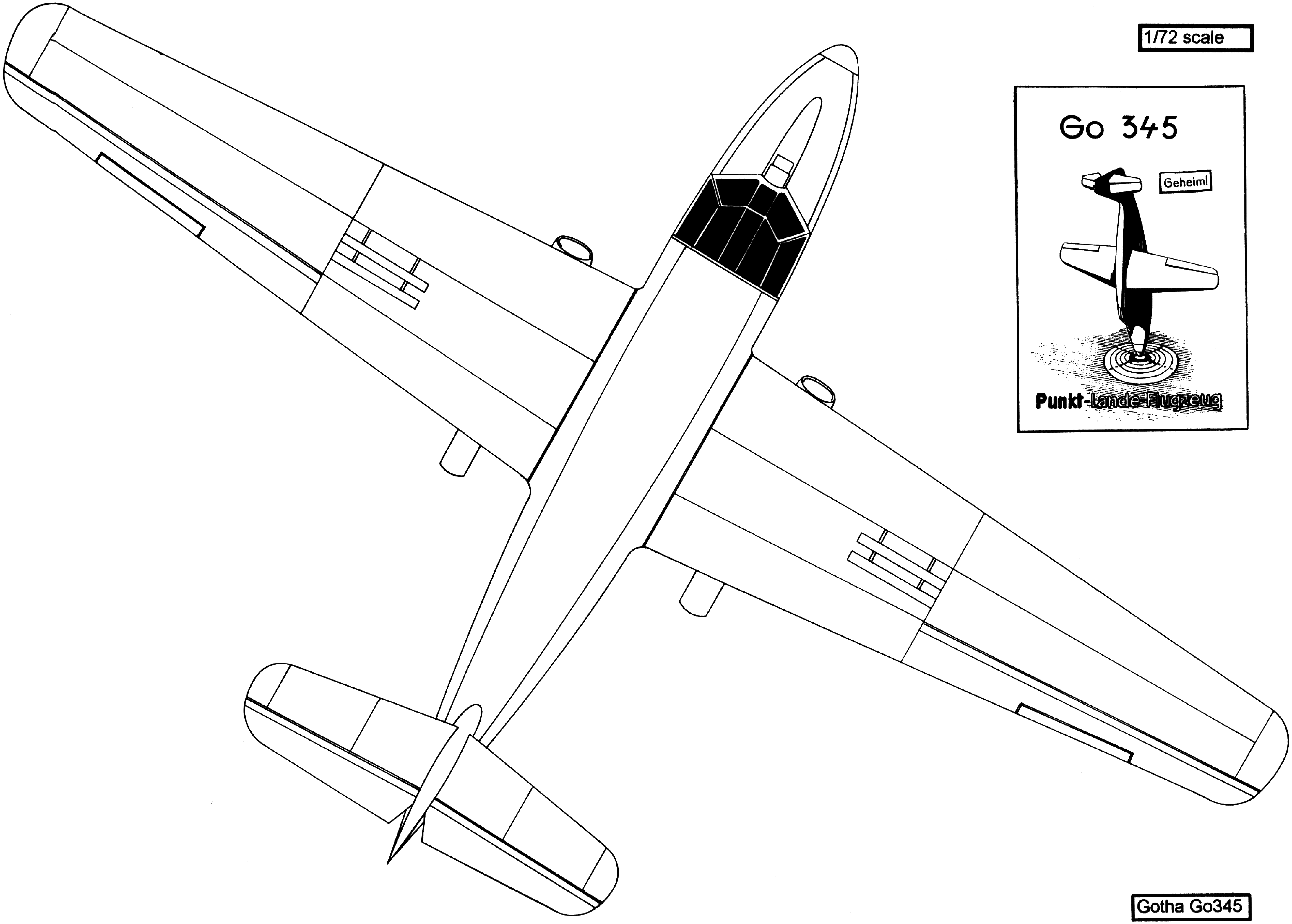
The first stage was powered by alcohol and liquid oxygen and the second one by hydrogen and liquid oxygen.

The take off was performed in a swimming pool under the water to avoid the overheating of the exhaust nozzles. A parachute was use to help the landing over the sea.

TECHNICAL DATA OF THE FILM

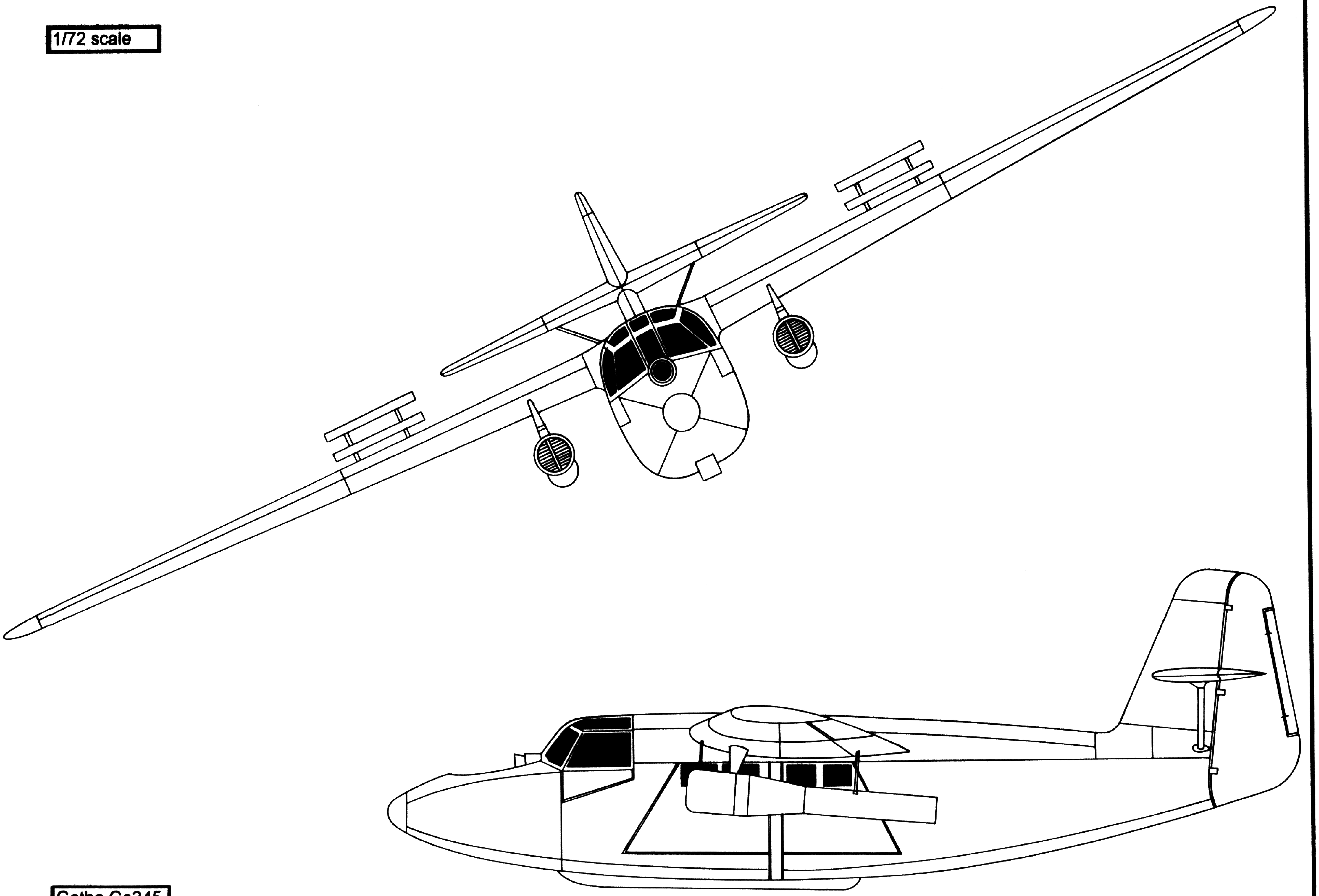
Tittle	"Frau im Mond" (Woman in the Moon) U.F.A. Germany, 1929, silent, 156 min.
Art directors	Emil Hasler, Otto Hunte, Karl Vollbrecht
Engine	A rocket of liquid propellant based on the A3 (A8) missile with two
Scientific advisor	Prof. Hermann Oberth
Producer & Writer	Fritz Lang
Screenplay	Thea von Harbou
Special effects	Konstantin Tschetwerikoff
Cast	Gerda Marcus, Willy Fritsch, Fritz Rasp

1/72 scale



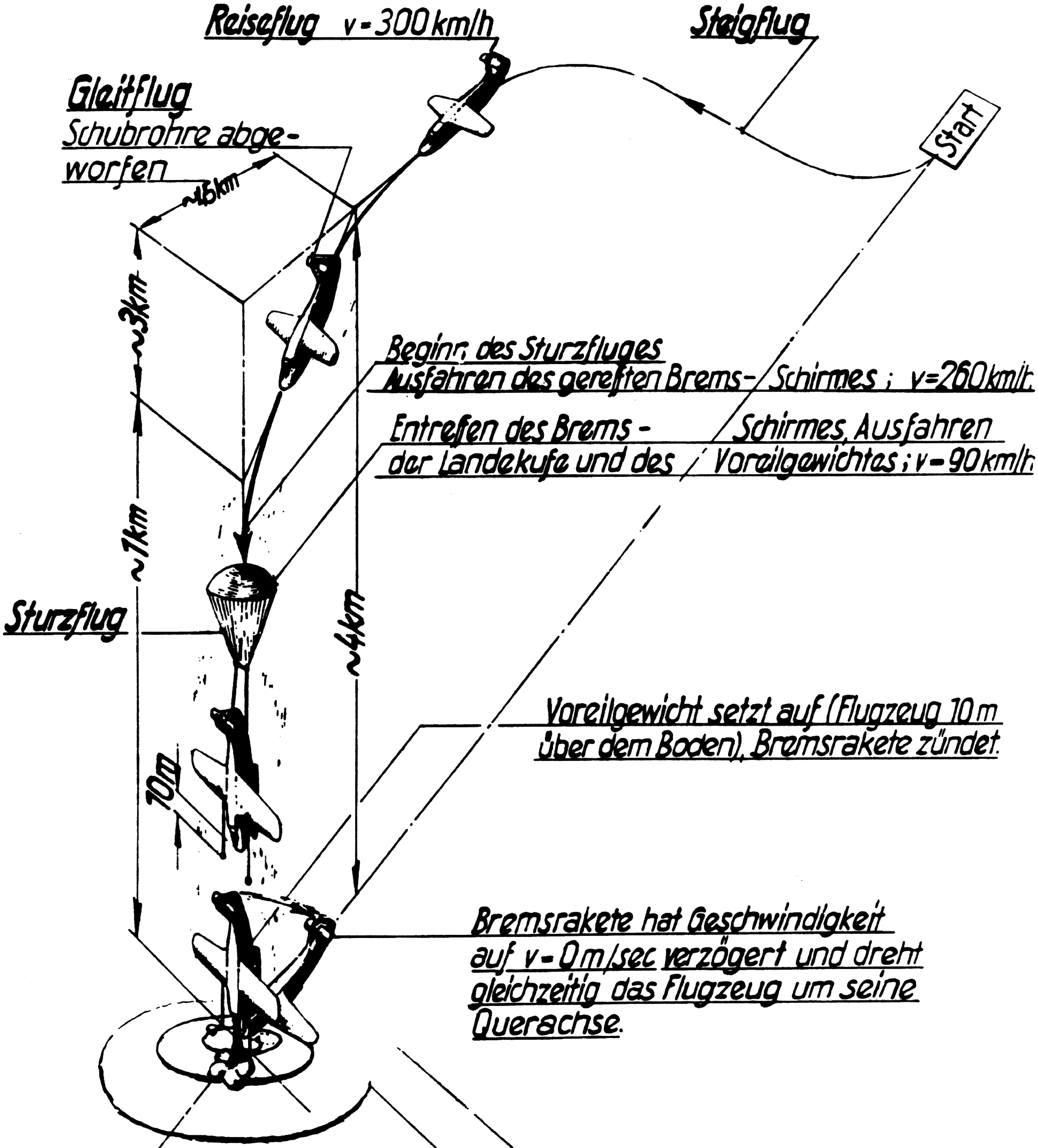
Gotha Go345

1/72 scale



Gotha Go345

Punktlandung normal



Beginn des Sturzfluges

Ausfahren des gerefften Brems-Schirmes; v=260 km/h.

Entreffen des Brems-Schirmes, Ausfahren der Landekufe und des Voreilgewichtes; v=90 km/h.

Voreilgewicht setzt auf (Flugzeug 10 m über dem Boden), Bremsrakete zündet.

Bremsrakete hat Geschwindigkeit auf v=0 m/sec verzögert und dreht gleichzeitig das Flugzeug um seine Querachse.

Bearbeiter:	Geprüft: 3.7.44. Ne		

Gotha Go 345

After the success achieved in capturing Eben Emael at the beginning of the war by using gliders, the Germans continued improving the performance of these machines.

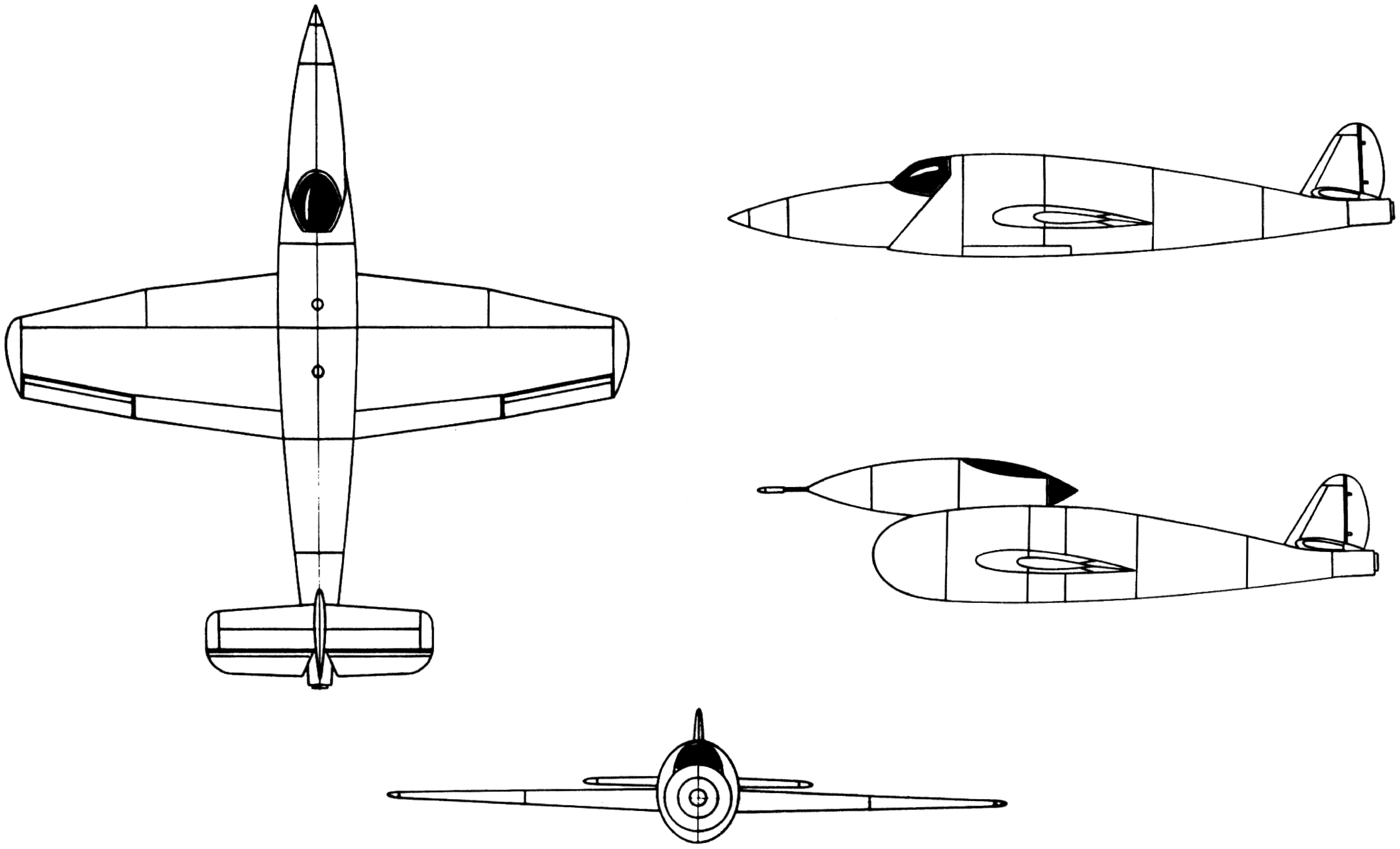
One of the development lines concentrated in obtaining machines that were able of accurate landing in the shorter possible space. To meet that objective, brake retro-rockets were used on a routine basis and succeeded when a fully loaded DFS 230 landed in just 40 m.

Its competitor Gotha produced a design able of vertical landing with the same load (12 men) in 0 m and 0 km/h. The machine dived vertically over the target from an altitude of 1,000 m. maintaining both control and speed by means of the air-brakes at 300 km/h
Afterwards a parachute reduced the speed to 90 km/h and a powerful retro-rocket located between the two pilots was then fired, when at 10 m. of altitude, with the effect of stopping the machine over its nose at 0 km/h (with an error margin of 5 m/sec). The airplane finally fell down over the shock-absorber skid to be unloaded.

Two different versions were designed, one towed and another propelled by two Argus pulsejets.

TECHNICAL DATA

Type	Cargo glider
Phase	Windtunnel test
Wings	Wooden structure and cladding
Fuselage	Wooden structure and cladding
Landing gear	Retractable skid
Engine	Two Argus As O14 pulsejets with 366 kp static thrust
Fuel tanks	Two fuel tanks in the wings
Armament	None
Wingspan	21 m
Length	13 m.
Height	4.2 m.
Wing area	49.9 m^2
Maximum weight	6,000 kg
Maximum speed	310 km/h
Ceiling	4,000 m.


1/72 scale

Gotha "Rammer"

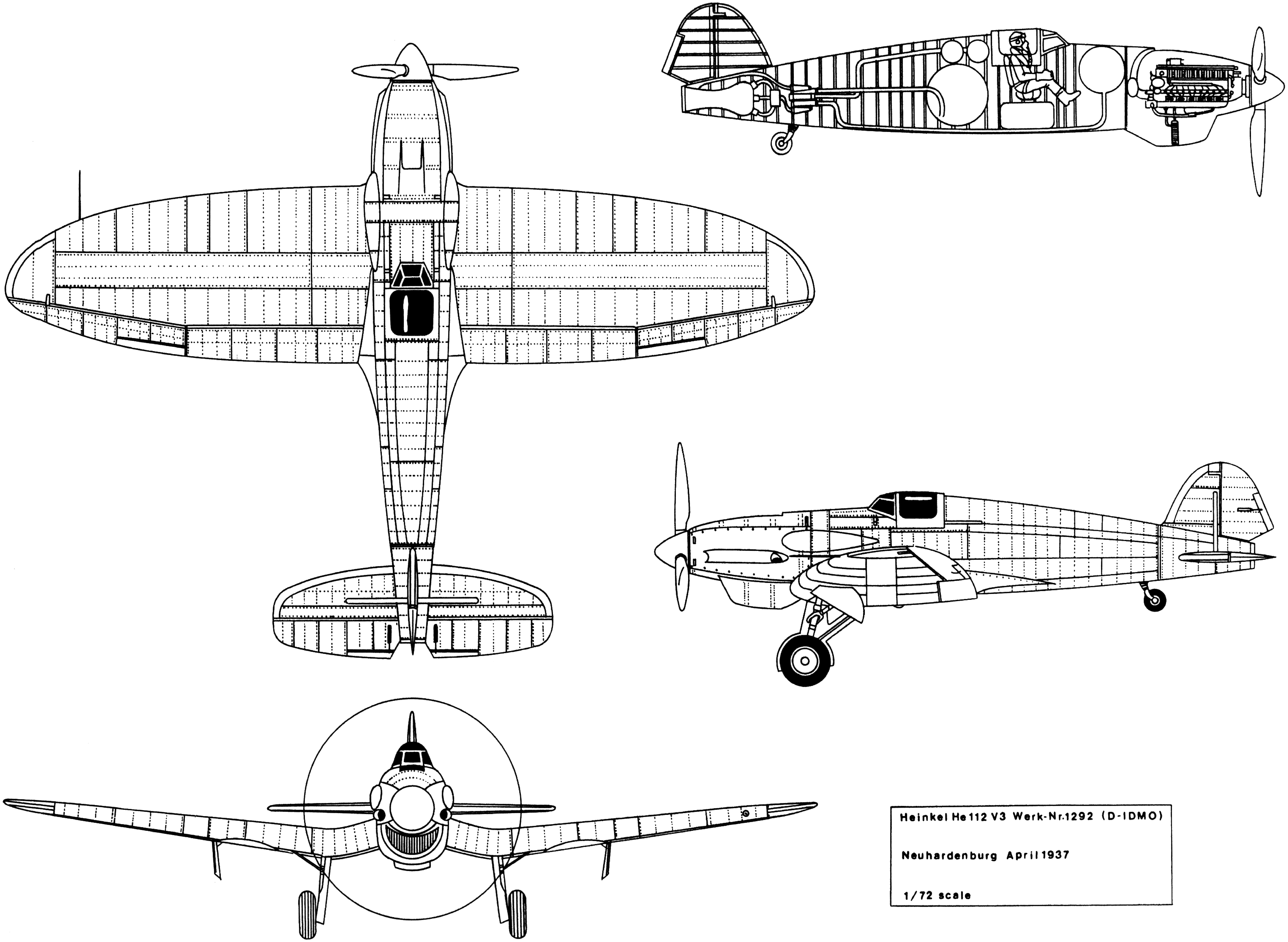
Gotha Rammer

Based in a patent registered on 10 October 1944 by Walter Wundes.
The pilot was lying within the armoured cockpit that had a shock absorber placed forward
In a later version the cockpit had a system of explosive bolts to detach it from the airplane prior to the impact.
It went fixed to the back of the airplane while a powerful hollow-charge, possibly for anti-ship use, was installed in the nose.

Both versions were towed by a fighter up to the nearness of the target and used a Schmidding rocket to accelerate.

TECHNICAL DATA (first version)

Type	Rocket glider
Phase	Design
Wings	Steel structure and cladding
Fuselage	Steel structure and cladding
Landing gear	Detachable take off trolley
Engine	One solid fuel Schmidding 109-533 rocket with 1,000 kp static thrust
Wingspan	6 m
Length	6 m.
Height	1.2 m.



Heinkel He 112 V3 Werk-Nr.1292 (D-IDMO)

Neuhardenburg April 1937

1/72 scale

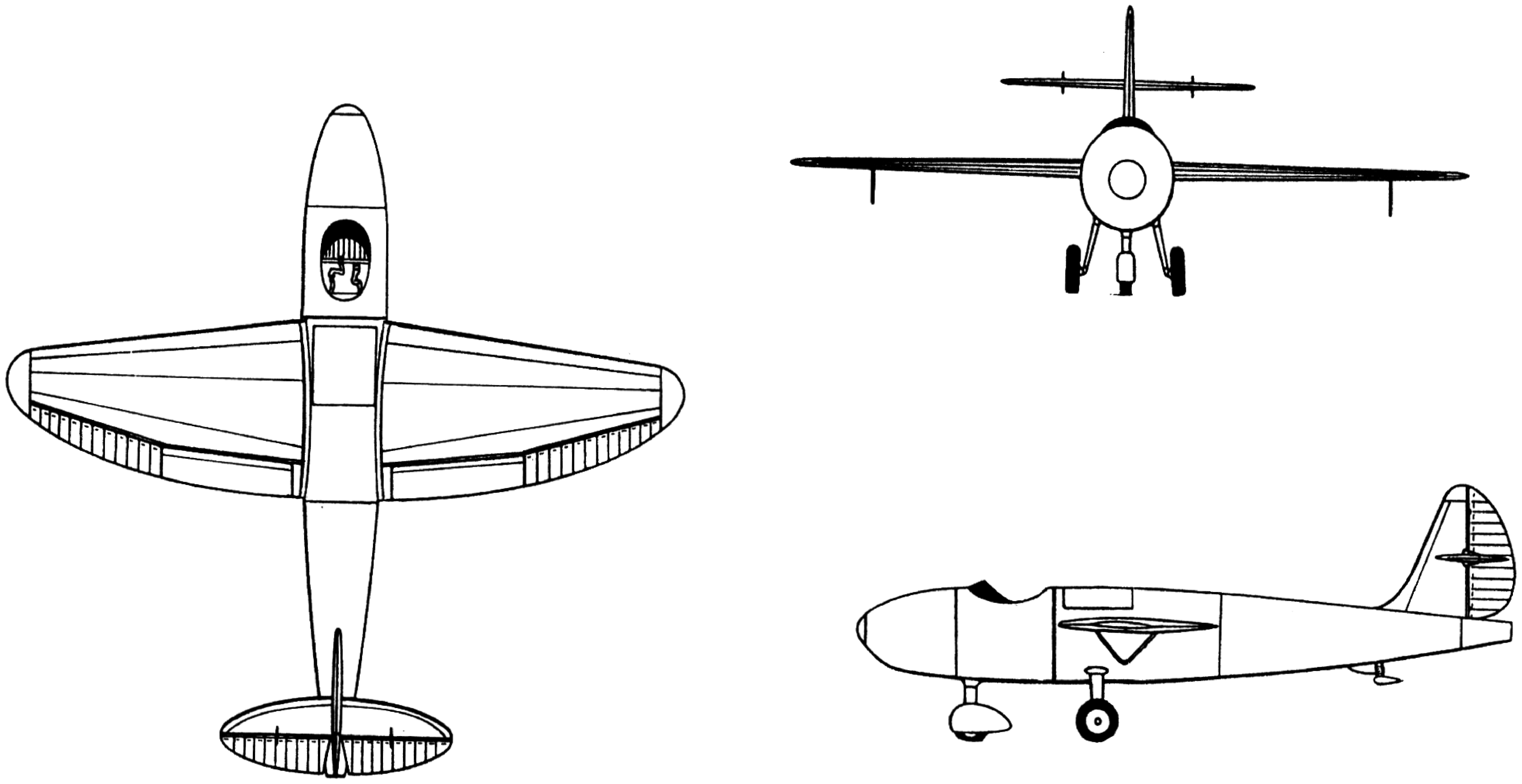
Heinkel He 112 V3

Besides cooperating with the Army, Wernher von Braun was interested in the application of rocket power to conventional airplanes to improve their performances.
In 1936, he installed a rocket of 300 kp of thrust to a Junkers A50 thus proving that the structure of the airplane was inadequate to stand the effort.
The team led by Dr. Walter Künzel then installed the engine in the fuselage of a He 112 V5 that exploded during the tests in March 1937.
The manufacturer provided a new airplane, a He 112 V3 (D-IDMO) piloted by Erik Warsitz that, after several tests with the piston engine, finally took off using just the rocket by the end of June 1937.

The OKL discontinued the manufacturing of the EMW rocket in favour of the model manufactured by Helmut Walter for safety reasons.

TECHNICAL DATA Phase I (Phase II between brackets)

Phase	Flight tests
Type	Experimental rocket aircraft
Wings	Metallic structure and cladding with flaps and two fuel tanks located between the landing gear housing and the fuselage
Fuselage	Metallic structure and cladding. It contained a liquid oxygen tank in front of the cockpit, another of methyl alcohol behind it and a third one of petrol under the pilot's seat, as well as several bottles of compressed air and the rocket engine
Empennage	Metallic structure and cladding,, braced tailplane
Landing gear	Retractable, fixed tail wheel
Engines	A liquid cooled Junkers Jumo 210 C of 12 cylinders in inverted "V" with a power of 600 h.p. and a EMW rocket engine working with liquid oxygen and methyl alcohol able to provide a thrust of 300 kp during 90 seconds
Propeller	A metallic three bladed VDM with constant speed and a diameter of 1,580 m.
Dimensions	
Wingspan	11.79 m.
Length	8.96 m.
Height	3.24 m.
Wing area	21 m^2
Maximum speed	480 km/h with a 90 seconds period of rocket burning



Heinkel He 176 V1
1/72 scale

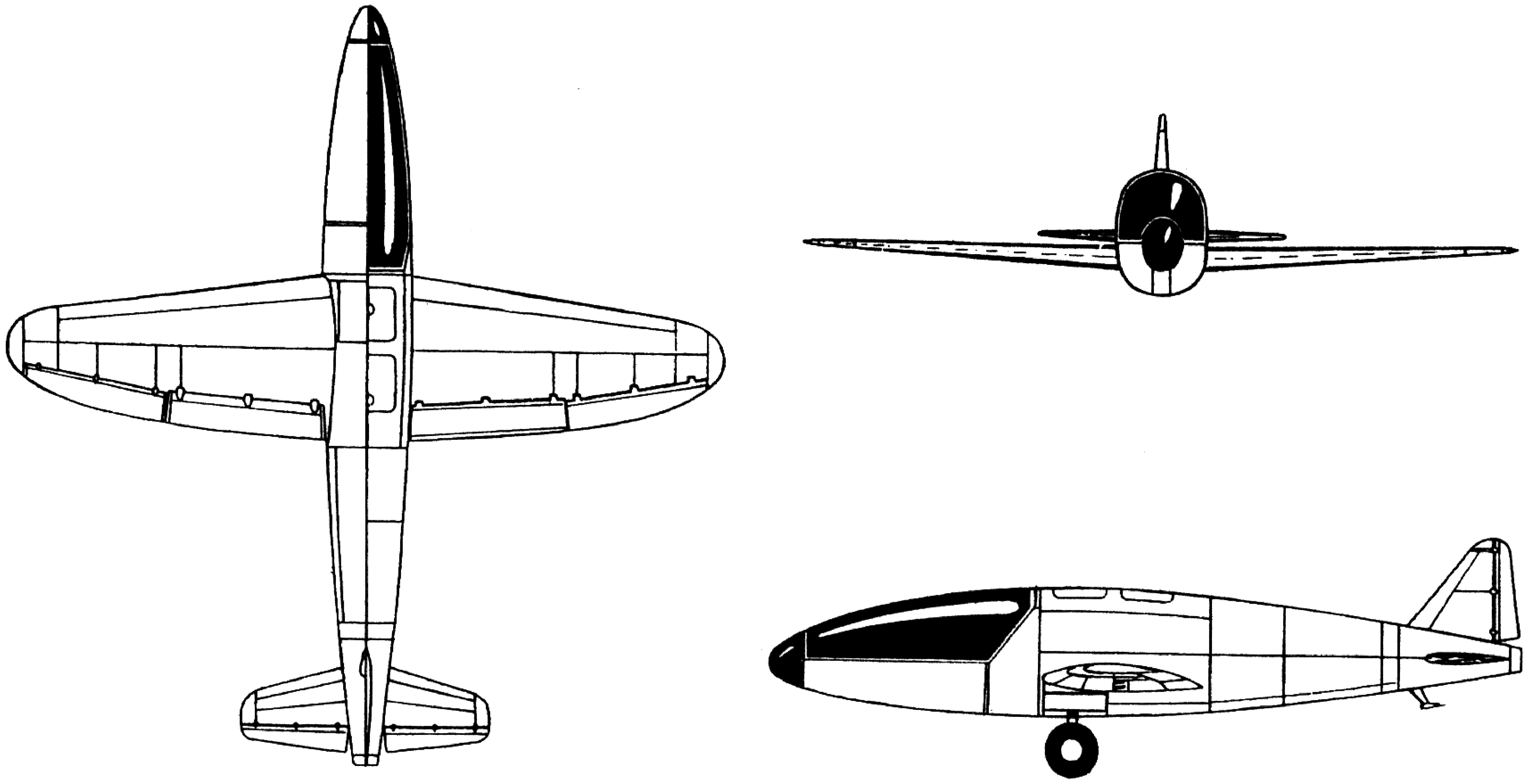
Heinkel He 176 V1

Research airplane specifically designed to test the performance during flight of the new rocket engines that used liquid propellants and that were developed by the German industry of the last thirties.

It flew for the first time on 20 June 1939, in Marienehe. The OKL decided not to continue with the tests, as it was not a practical fighter, and the project was left down.

TECHNICAL DATA

Type	Research airplane
Phase	Flight tests
Wings	Metal structure and cladding
Fuselage	Metal structure and cladding
Landing gear	Fixed, of the tricycle type
Engine	A Walter HWK R I-203 rocket with 600 kg of thrust
Armament	None
Propellant tanks	One of T-Stoff and another of C-Stoff in the fuselage, behind the pilot
Wingspan	5.4 m
Length	5.2 m
Height	2.1 m
Wing area	5.8 m^2
Maximum speed	400 km/h



Heinkel He 176 V2
1/72 scale

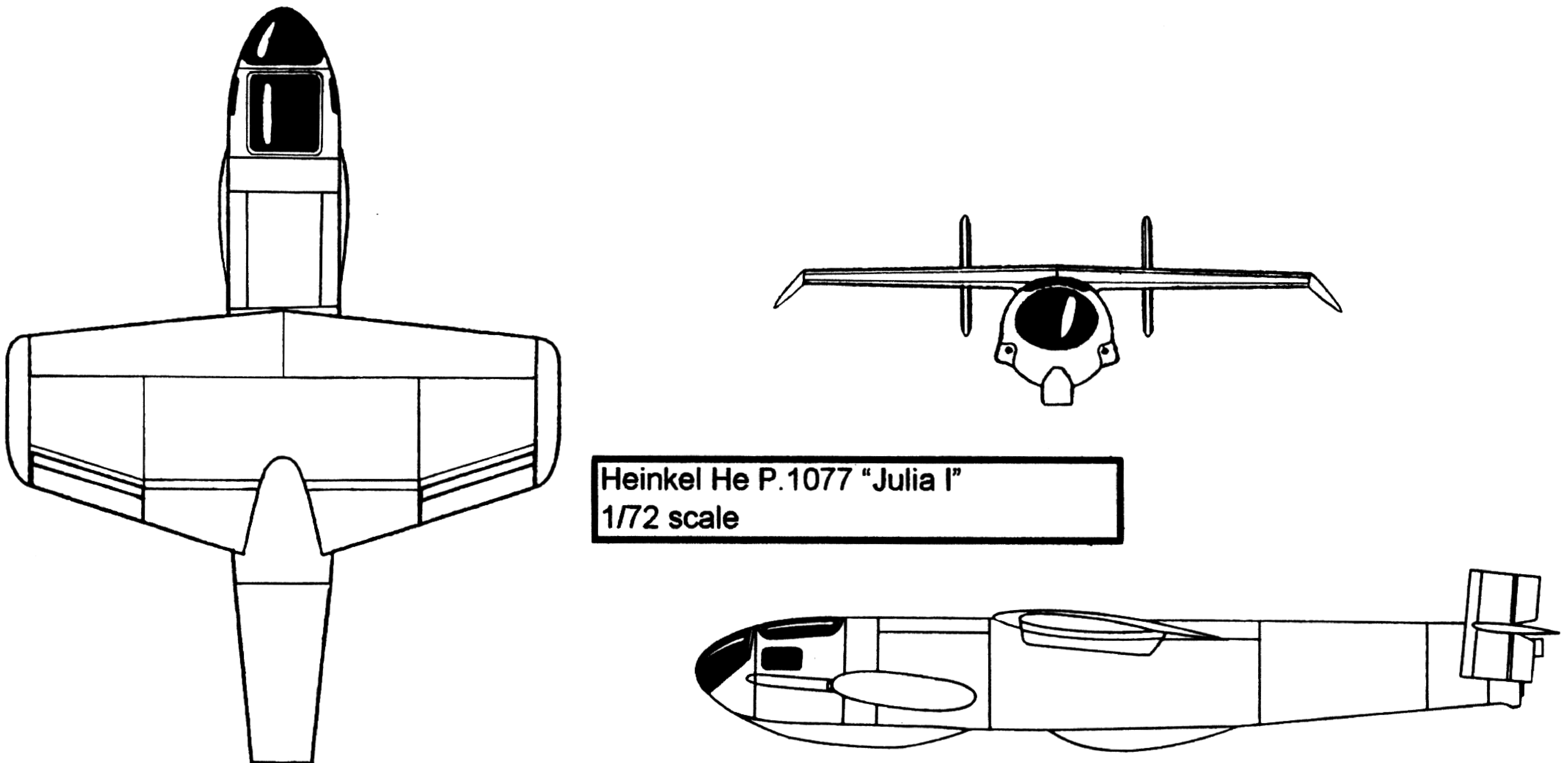
Heinkel He 176 V2

Second prototype of the series for which design several aerodynamic refinements had been planned to achieve the maximum speed during flight tests.
The wingspan has been shortened, the cockpit fitted with glass, like the one in the He 111, and a retractable landing gear based on the He 178 one was designed.

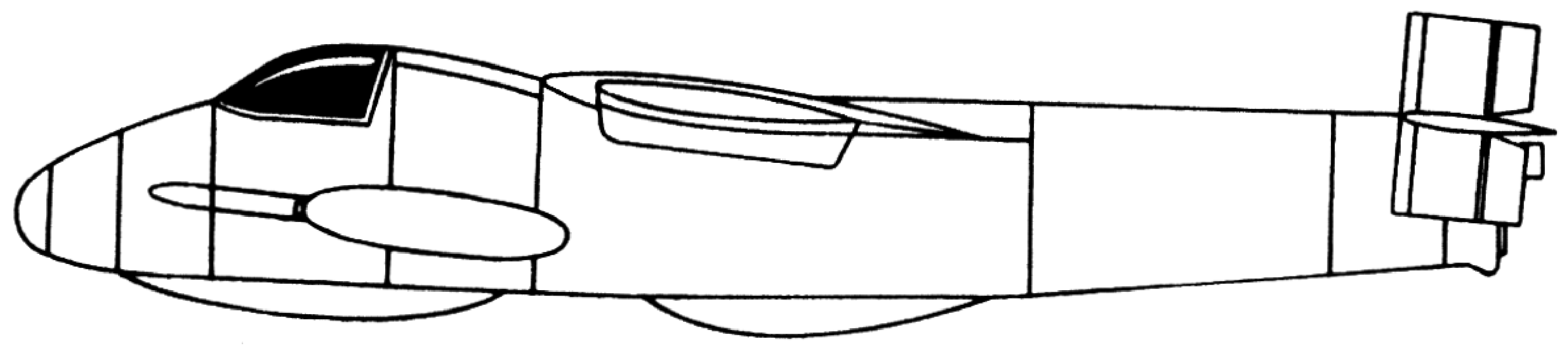
The cancellation of the program avoided the construction of the He 176 V2.

TECHNICAL DATA

Type	Research airplane
Phase	Flight tests
Wings	Metal structure and cladding
Fuselage	Metal structure and cladding
Landing gear	Retractable
Engine	A Walter HWK R I-203 rocket with 600 kg of thrust
Armament	None
Propellant tanks	One of T-Stoff and another of C-Stoff in the fuselage, behind the pilot
Wingspan	5 m
Length	5.2 m
Height	1.44 m
Wing area	5.4 m^2
Maximum weight	1,620 kg
Maximum speed	750 km/h
Ceiling	9,000 m
Range	110 km



Heinkel He P.1077 “Julia I”
1/72 scale



Heinkel He P.1077 “Julia II”
1/72 scale

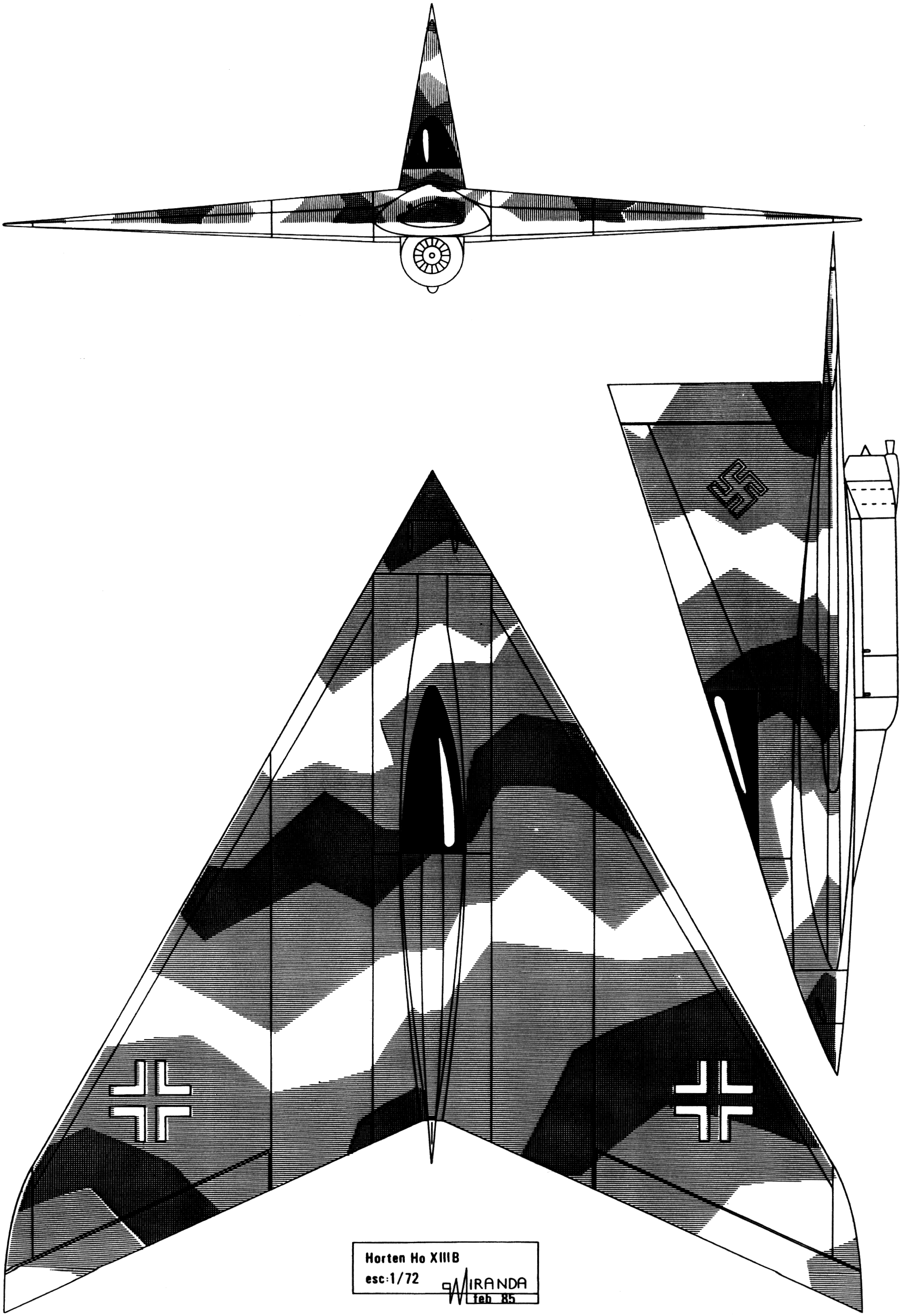
Heinkel P 1077 "Julia"

Project of target interceptor propelled by rockets and presented to the RLM in the Spring of 1944 to compete against the "Natter".
In its original design, the "Julia" was to be transported under a bomber, similarly to the Arado Ar E-381 project This justified the prone position of the pilot and the twin tailfin.

An improved variant of the project, the "Julia II", was to be launched from a ramp similar to the one used for the launch of the "Natter". To better stand the acceleration, the pilot was seating in a conventional position. The take off was help by four rockets of solid fuel and the landing was made by means of skids, like in the Me 163 "Komet".
The project was cancelled on 22 December 1944 and the prototypes dismantled.

TECHNICAL DATA

Type	Target defence interceptor
Phase	Prototype construction
Wings	Wood structure and cladding
Fuselage	Metallic structure and cladding
Landing gear	Two skids under the fuselage
Engine	A Walter HWK 509 C rocket using liquid propellants and two combustion chambers, the main one with 1,700 kg of thrust and the cruiser one with 300 kg of thrust Four solid fuel Schmidding 109-533 booster rockets were used for the take off providing 1,000 kg of thrust for 12 seconds
Armament	Originally, it was planned the installation of two MG 151/20 guns of 20 mm under the wings (16-8-44). Afterwards, in September 1944, a configuration of two Mk 108/30 of 30 mm to both sides of the pilot was adopted.
Fuel tanks	One of C-Stoff with 222 kg and another of T-Stoff with 703 kg in the fuselage
Wingspan	4.6 m
Length	6.8 m
Height	1.4 m
Wing area	7.3 m^2
Maximum weight	1,795 kg
Maximum speed	900 km/h
Ceiling	16,000 m
Range	5 minutes



Horten Ho XIIIB

esc:1/72

MIRANDA
feb 85

Horten Ho XIII B

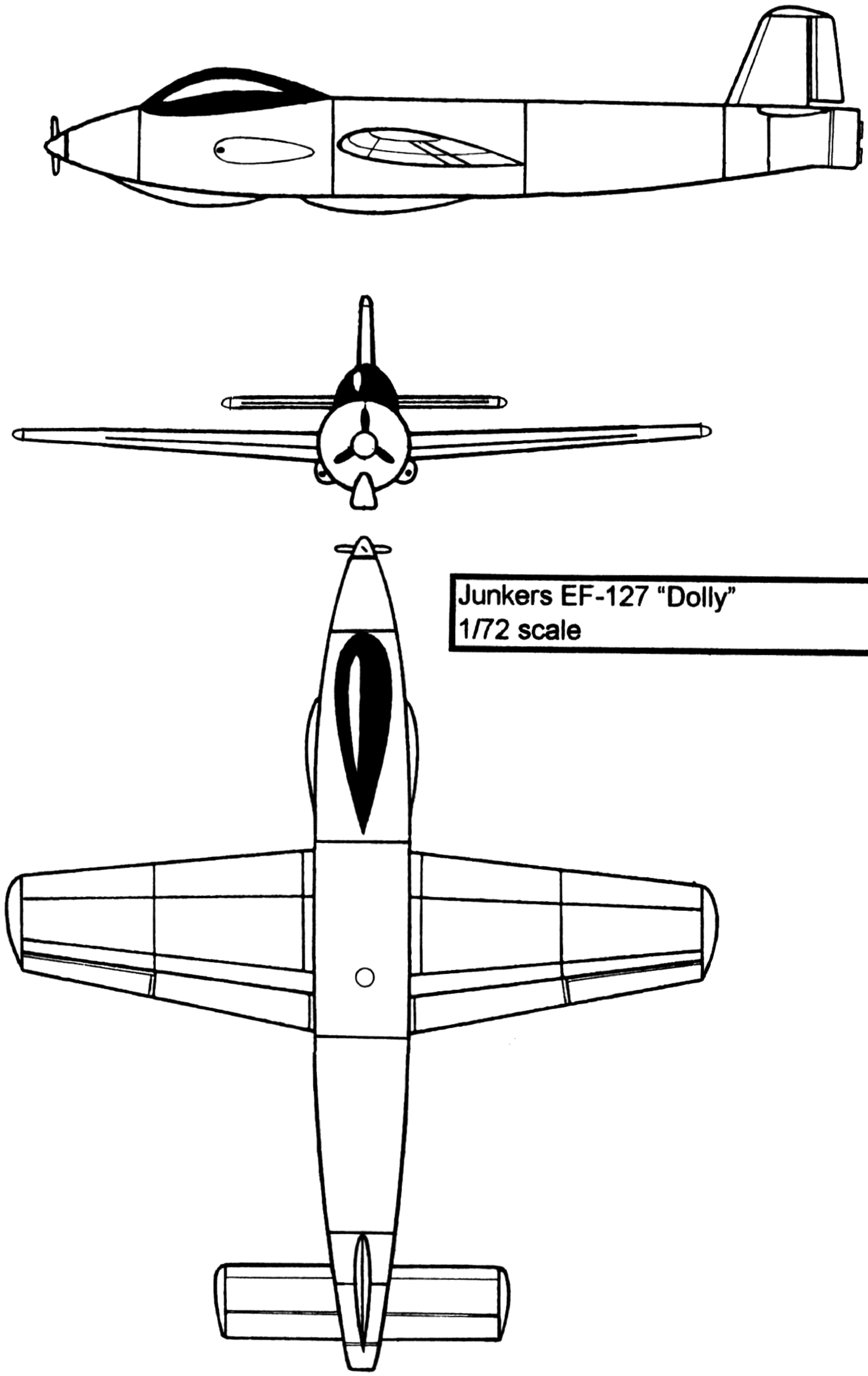
Design of air-superiority fighter with supersonic flight capabilities based on the Ho XIII A glider.

The plan was to use the same construction system than for the Ho 229 with a structure of steel tubes and plywood cladding.
The 60° swept wing was relatively thick and could store a great amount of fuel for the rocket. This could be used to different purposes -as a help for a fast take off, for supersonic flying or to reach great altitude.

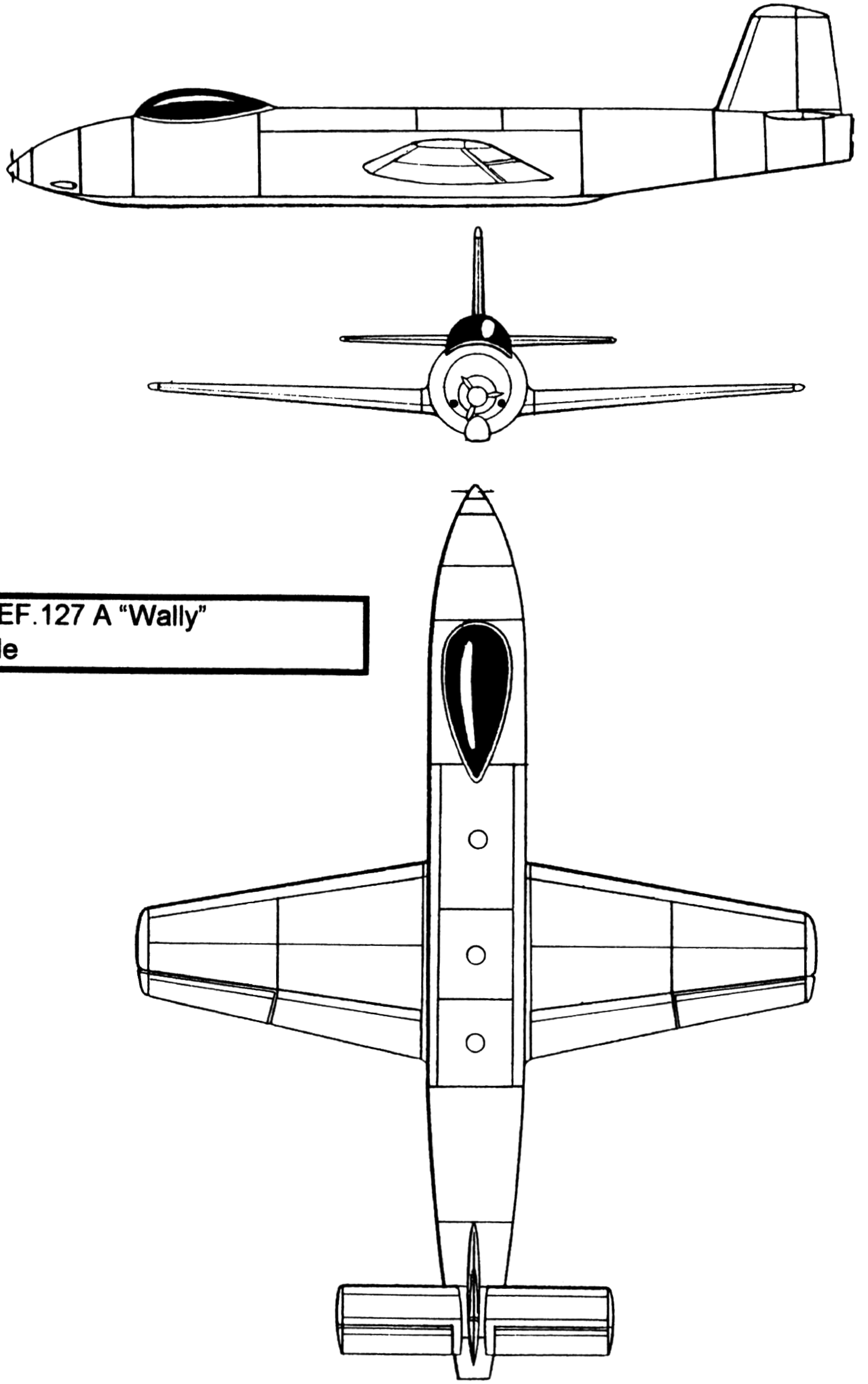
Two versions are known, one with the engine suspended under the fuselage and another with the engine installed within the fuselage and two air intakes to both sides of the nose.
It was an slightly less fast design than the last "HG" versions of the Me 262 but more manoeuvrable.

TECHNICAL DATA

Type	Supersonic mixed-power fighter
Phase	Windtunnel model
Wings	Steel structure and wooden cladding
Fuselage	Steel structure, wooden cladding, pressurised cockpit, ejectable seat.
Landing gear	Tricycle type
Engine	One HeS 011AO turbojet with 1,300 kp static thrust plus one bifuel Walter 109-509 S2 rocket with 1,993 kp static thrust
Fuel tanks	K1 kerosene, T-Stoff and C-Stoff in the wings
Armament	Two Mk 213/20 and one Mk 108/30 in the nose
Wingspan	11.9 m
Length	11.9 m.
Height	3.6 m.
Wing area	37.8 m2
Maximum weight	7,000 kg
Maximum speed	Mach 1.07
Ceiling	15,000 m
Range	2,000 km



Junkers EF-127 "Dolly"
1/72 scale



Junkers EF.127 A "Wally"
1/72 scale

Junkers EF 127

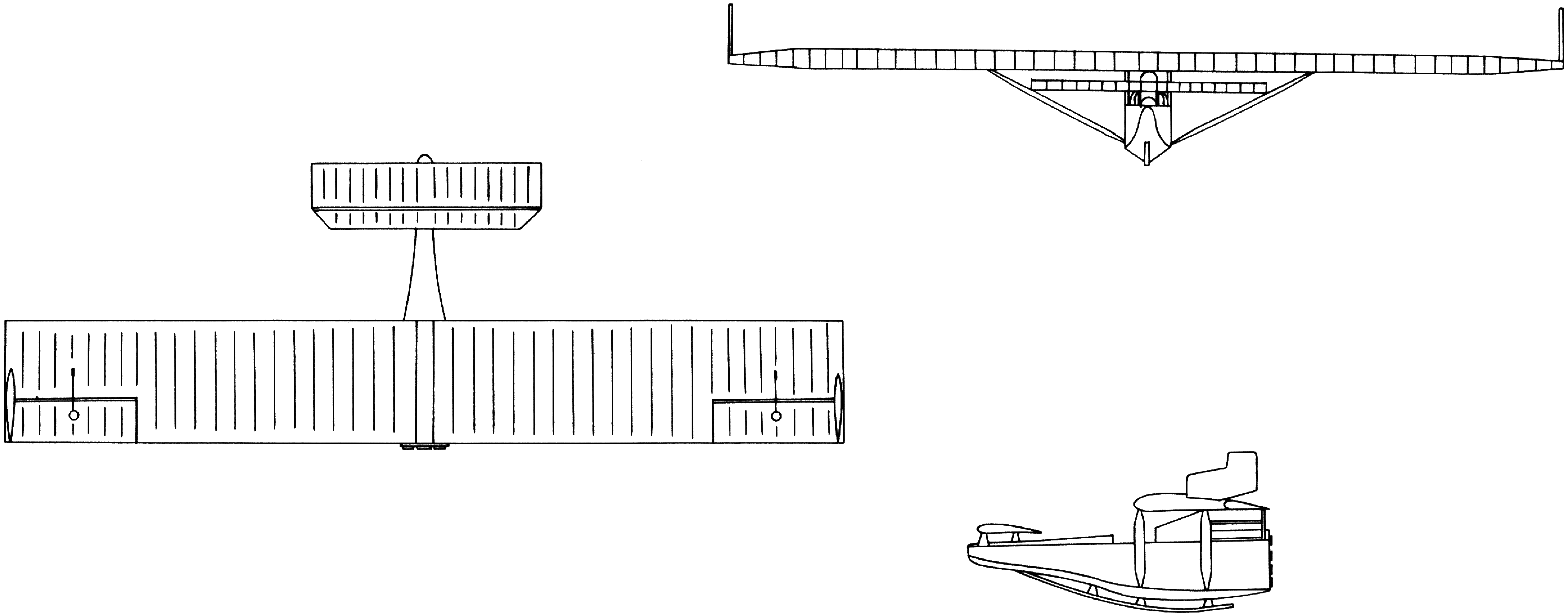
Target defence project propelled by rockets and designed at the beginning of 1944 to compete against the “Natter”, the “Julia” and the “Komet”

The first design was named EF-127 “Dolly” and should take off from a ramp like the “Julia II”. It was armed with two guns of 30 mm and housed to both sides of the pilot in the outer part of the fuselage.
It should land over retractable skids located under the fuselage.

The second design, denominated EF-127 A “Wally”, was planned to take off from a detachable trolley, like the “Komet”, and also like the latest it landed over an only, though larger, skid. The armament was moved to the nose, ahead of the pilot.

TECHNICAL DATA (“Wally” in brackets)

Type	Target defence interceptor
Phase	Design
Wings	Wood structure and cladding
Fuselage	Metallic structure and cladding
Landing gear	Two (one) skids, retractable
Engine	A Walter HWK 509 C of liquid propellants and two combustion chambers. The main one of 1,700 kg of thrust and the cruiser one, of 300 kg. It used four Schmidding 109-533 rockets of solid fuel with 1,000 kg of thrust each, fitted under the wing roots.
Armament	Two Mk 108/30 guns of 30 mm to both sides of the pilot (in the nose)
Propellants tanks	One of C-Stoff and two of T-Stoff in the fuselage (two of C-Stoff of 250 kg each and two of T-Stoff with 1,100 kg in total).
Wingspan	6.6 m (6.6 m)
Length	7.7 m (7.44 m.)
Height	1.9 m (1.87 m)
Wing area	9 m^2 (9 m^2)
Maximum weight	(2,800 kg)
Maximum speed	(1,000 km/h)
Ceiling	(10,000 m.)
Range	(107 km)



Lippisch "Ente"

1/72 scale

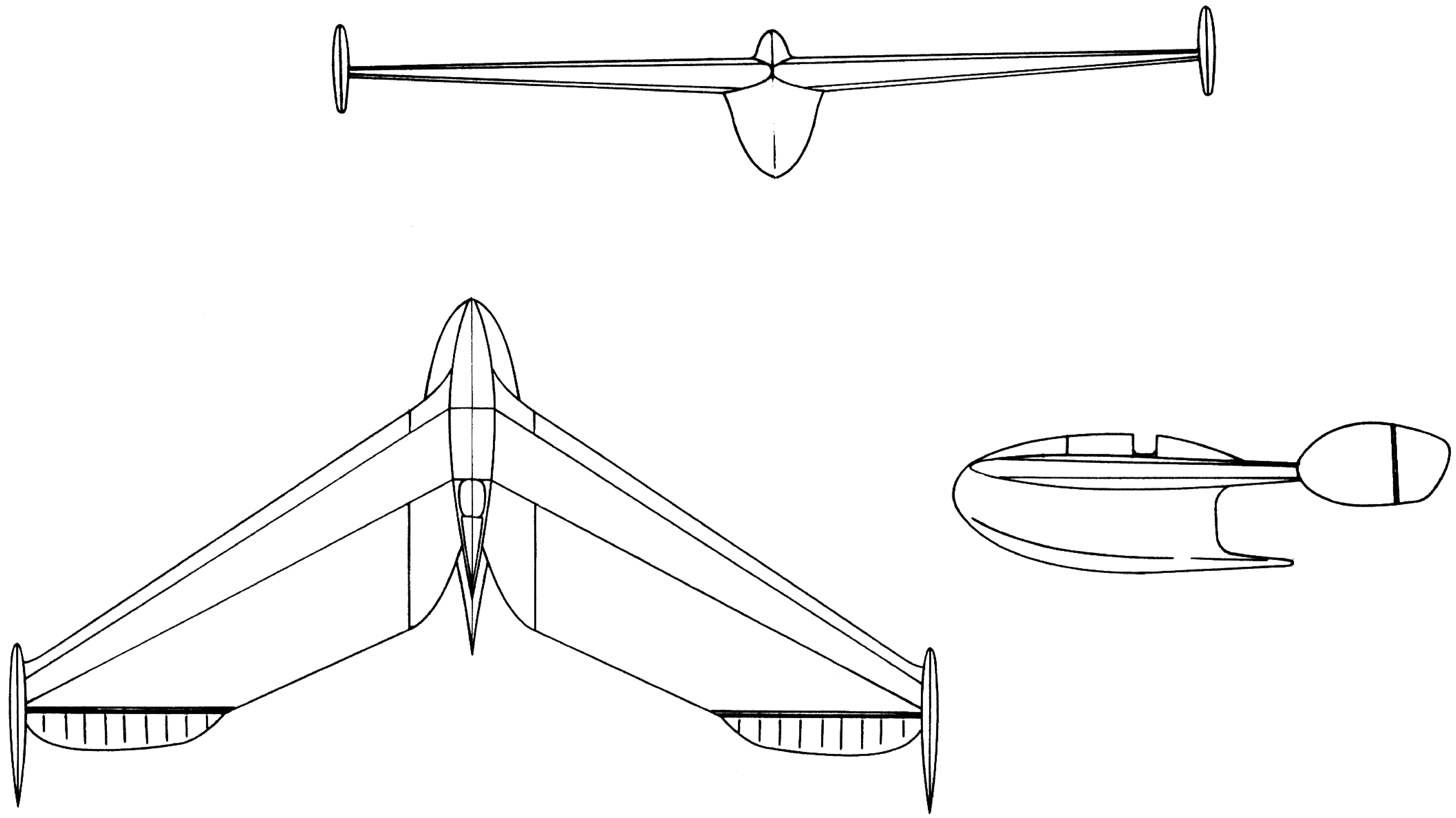
LIPPISCH "Ente"

Based on a project by Max Valier and built by the Rhine-Rossiten Research Institute under the direction of Alexander Lippisch.

It was the first airplane to fly propelled by rockets, piloted by Fritz Stamer on 11 June 1928.
The flight took place in Wasserkruppe lasting only sixty seconds and reaching 1,200 m..

TECHNICAL DATA

Type	Experimental rocket-glider
Phase	Flying test
Wings	Wood Structure and fabric cladding
Fuselage	Wood structure and cladding
Landing gear	One fixed skid
Engine	Two Sander rockets of solid fuel
Wingspan	9.2 m
Length	3.3 m
Height	1.7 m
Wing area	12 m^2
Maximum speed	62 km/h
Range	1,200 m



Lippisch/ Fritz von Opel
Raketenflugzeug 1929

1/72 scale

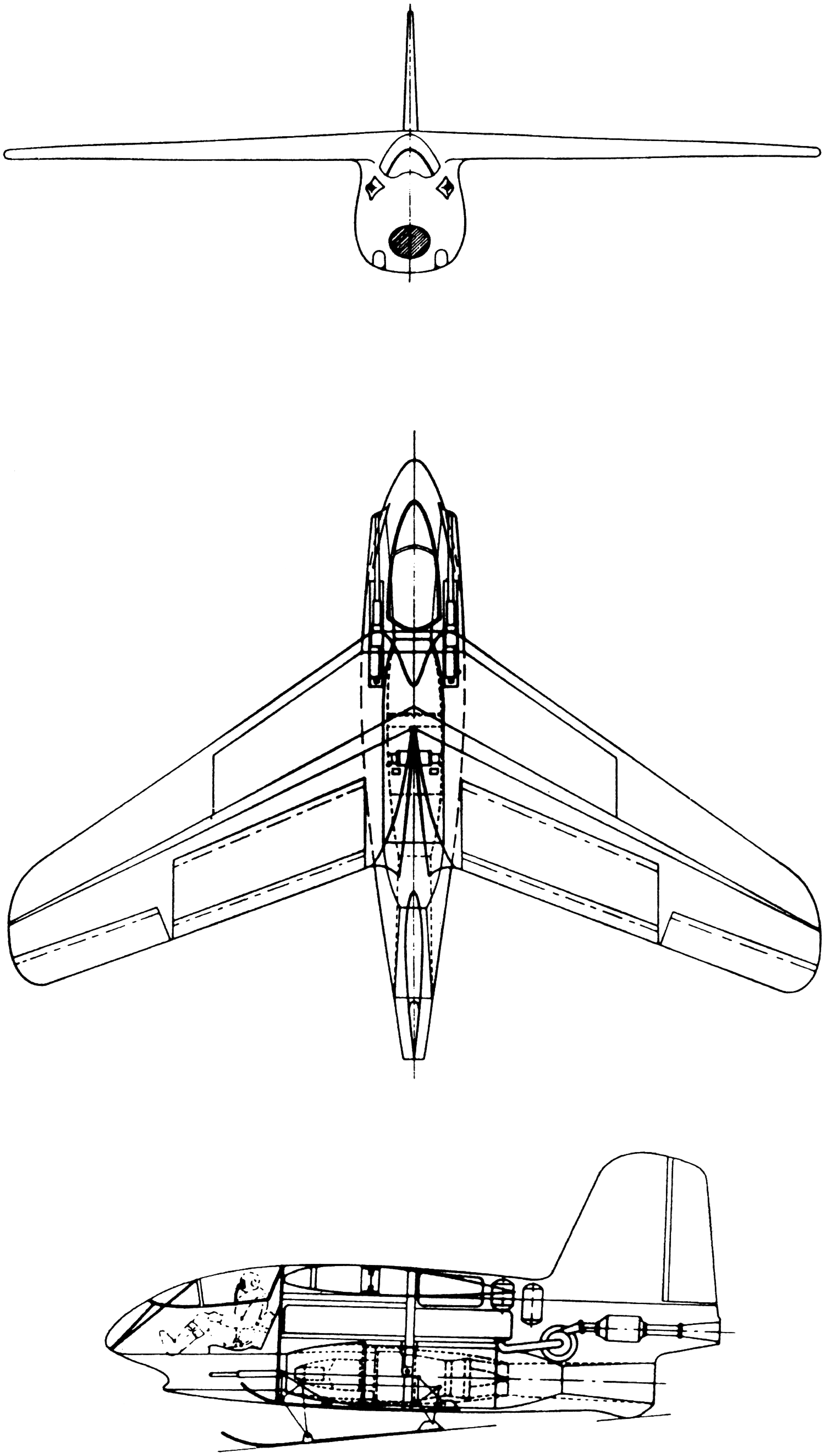
Lippisch/Fritz von Opel Rak 1929

Designed to amend the stability deficiencies observed during the flight of the "Ente"

The tests made with scale models were not satisfactory and the model was finally built as a "Storch V" propelled by a conventional piston engine DKW of 8 hp.

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Scale models flight
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	One fixed skid
Engine	Sander solid fuel rockets
Wingspan	8 m
Length	3.9 m.
Height	1.3 m.



1/72 scale

LIPPISCH P01-113

Lippisch P.01-113

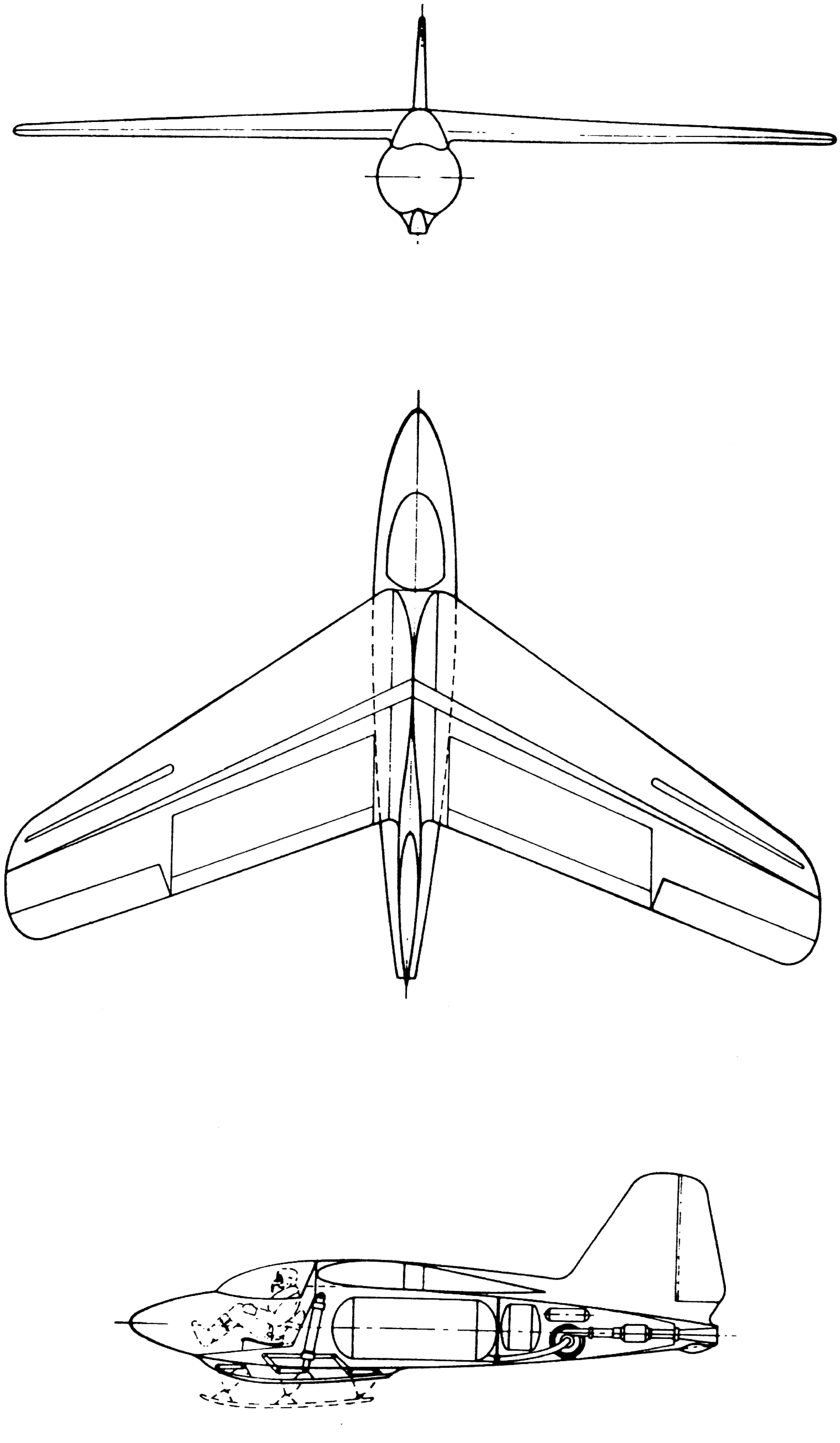
Mixed power fighter design equipped with a BMW 003 turbojet for cruise flight and a BMW 3390 bifuel rocket for a fast take off or high altitude flight. It used a detachable trolley to take off and a folding skid for landing.

The shoulder wing housed the fuel for the turbojet. The fuel for the rocket was in the fuselage, between the wing and the BMW 003.

The 7 July 1940 design would result in the P01.115 with turbojet and dorsal air intake.

TECHNICAL DATA

Type	Mixed power fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding, armoured and pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 003 turbojet with 800 kp static thrust plus one BMW 3390 bifuel rocket (109-510) with 300-1,500 kp static thrust
Fuel tanks	Two of B4 petrol for the turbojet in the wings, one of M-Stoff and another of SV-Stoff for the rocket in the fuselage
Armament	Two MG 151/20 guns to both sides of the cockpit
Wingspan	9 m
Length	6.75 m.
Height	3 m.



1/72 scale

LIPPISCH P01-114

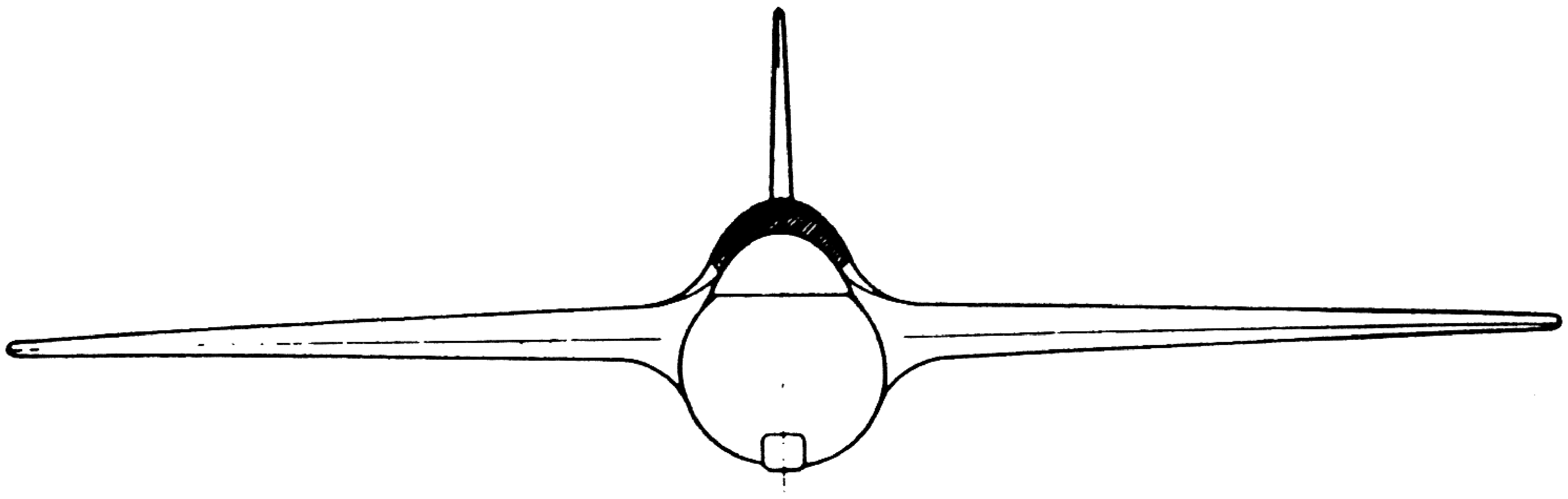
Lippisch P.01-114

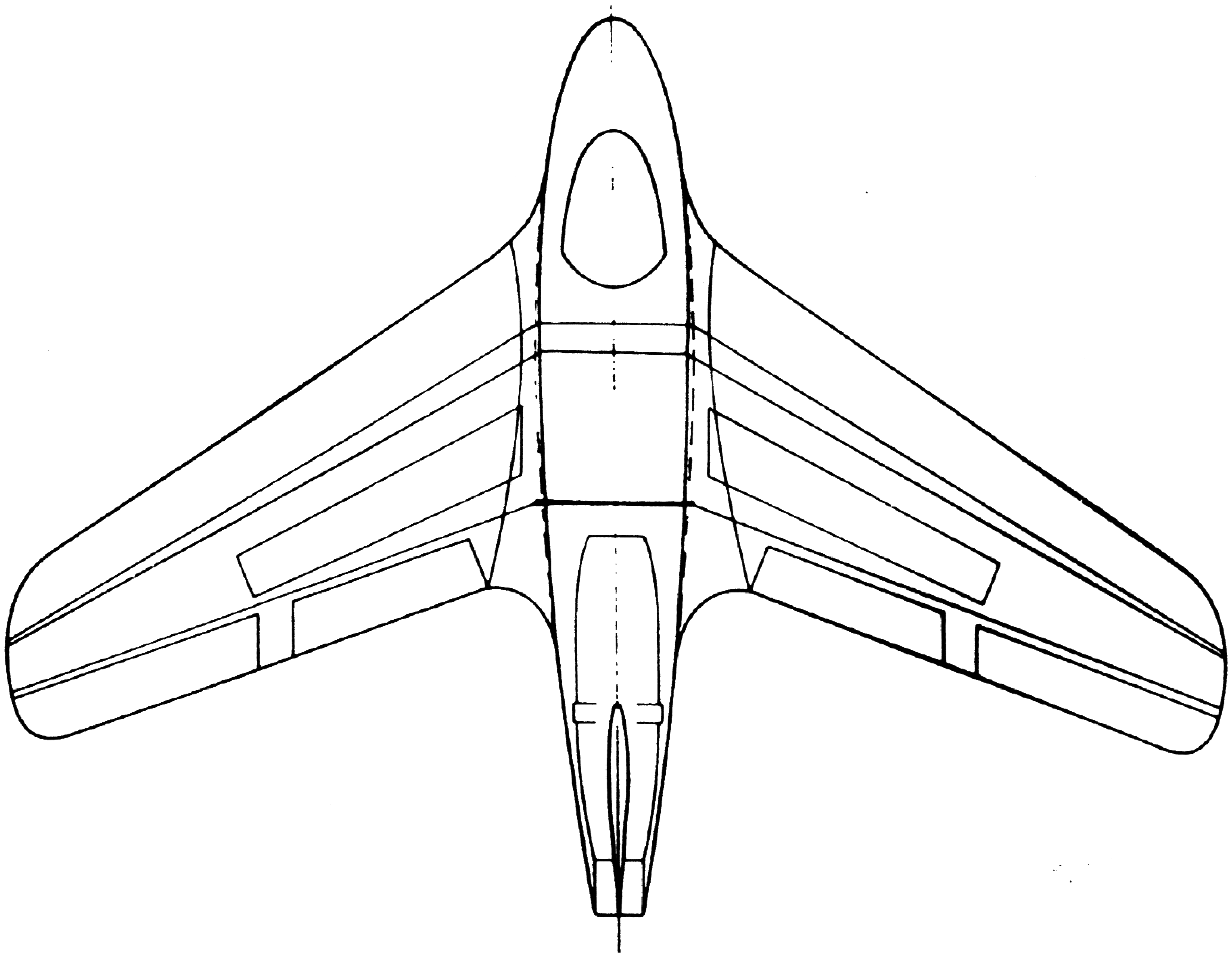
Simplified version of the P01-113 without turbojet and with more space for the rocket fuel in the fuselage.

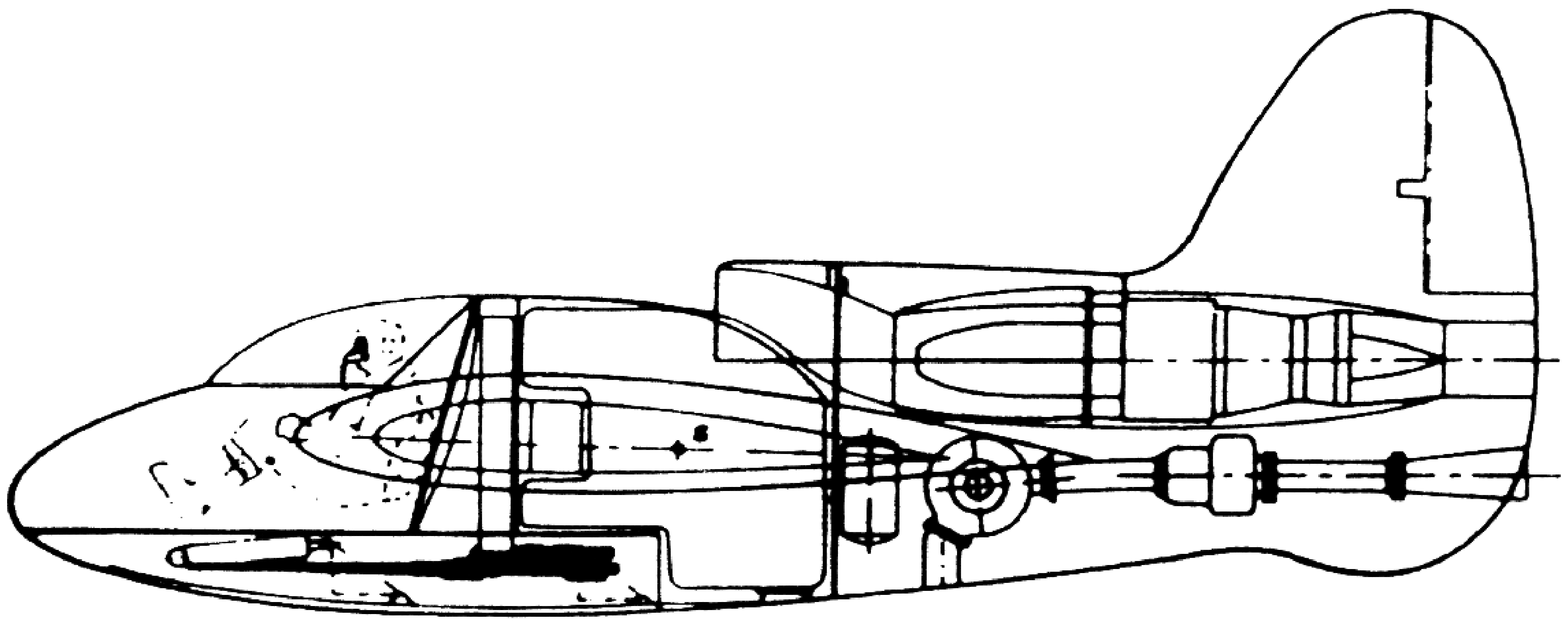
There is no type of armament specified for the July 1940 design. The design is modified with mid-wing position and a Walter 109-509 A-2 rocket with 1,700 kp static thrust in June 1941

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 3390 bifuel rocket (109-510) with 300-1,500 kp static thrust
Fuel tanks	One of M-Stoff and another of SV-Stoff in the fuselage
Armament	None
Wingspan	9 m
Length	6.5 m.
Height	2.7 m.







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LIPPISCH P01-115

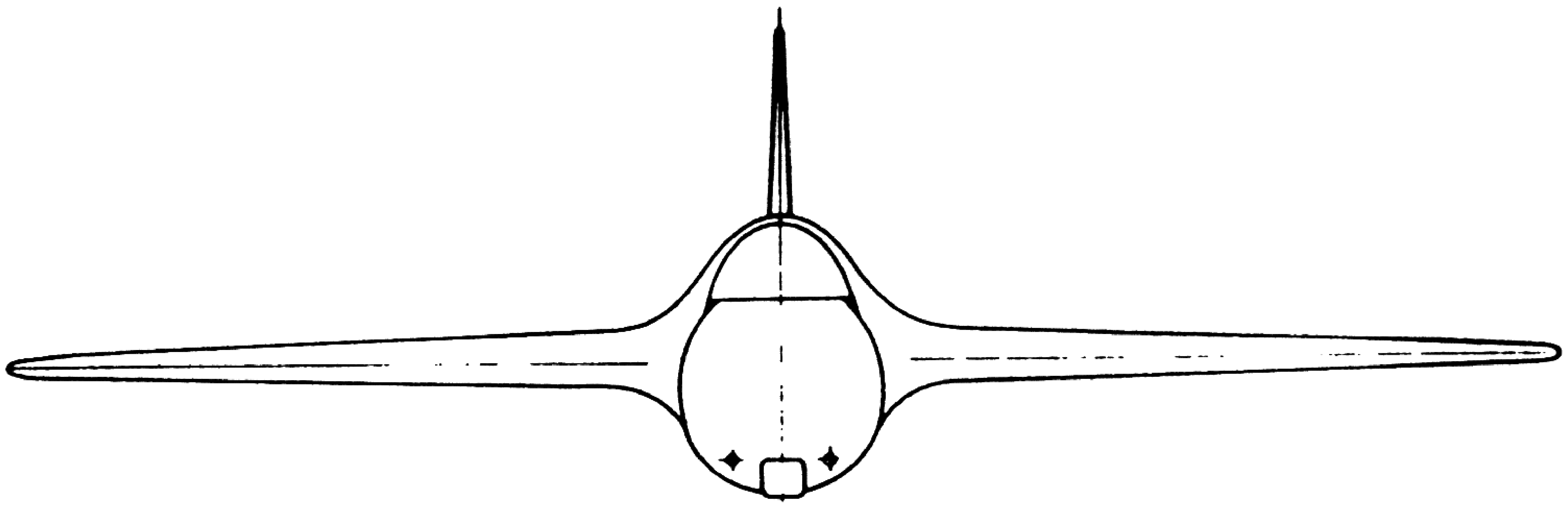
Lippisch P.01-115

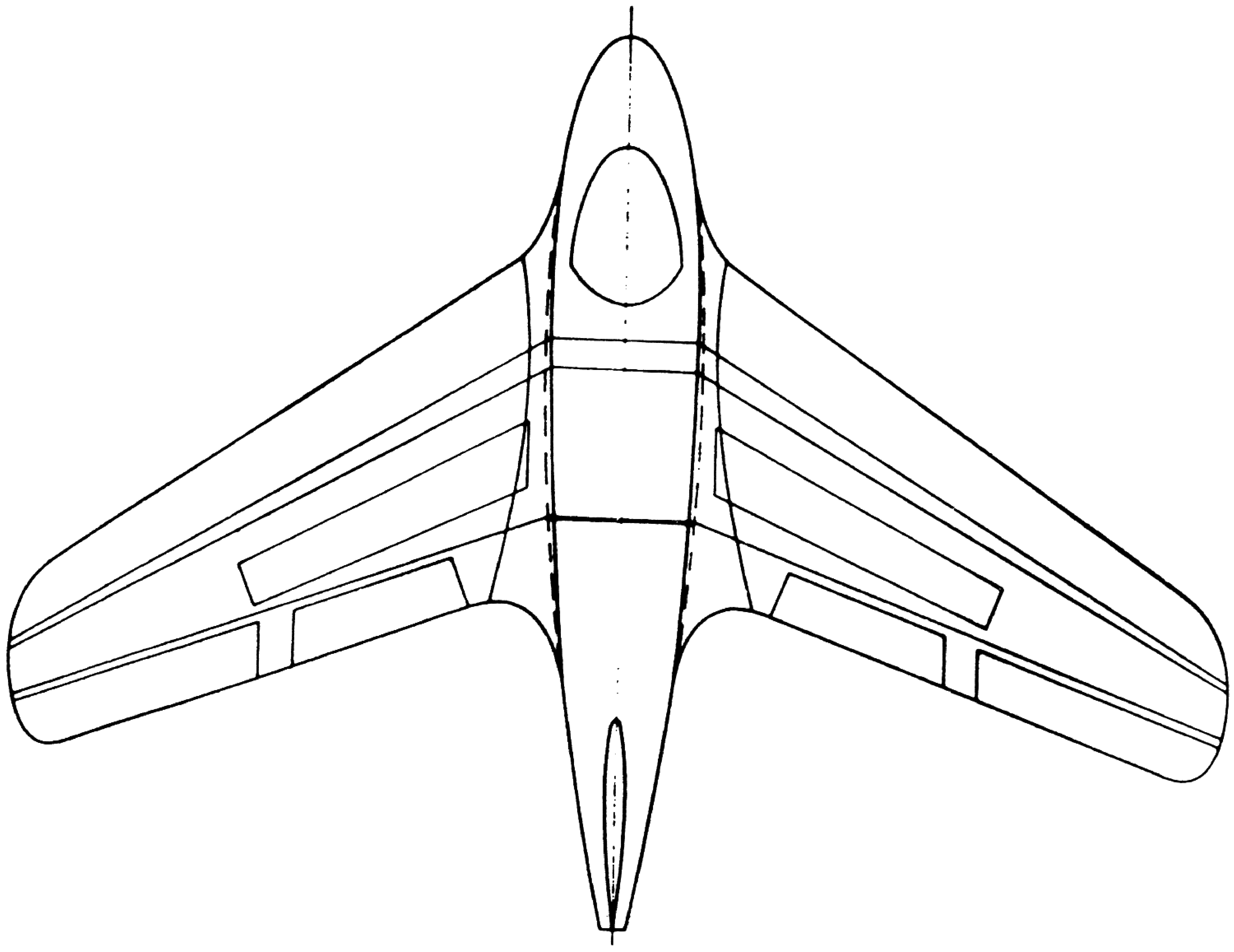
Designed in July 1941, it was a variant of the P01.113 but with the turbojet and the air intake located in dorsal position, considered safer for landing.

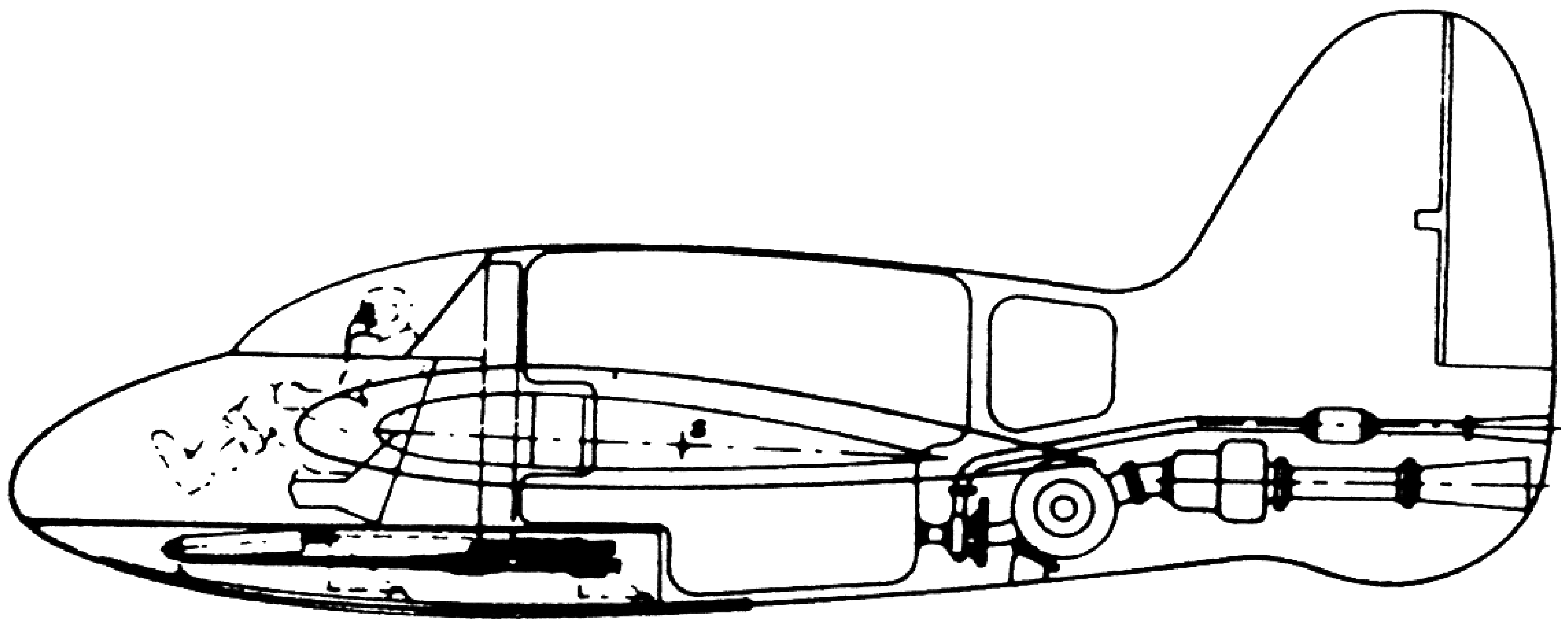
The shoulder wing was replaced by a mid wing.

TECHNICAL DATA

Type	Mixed power fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Armoured and pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 003 turbojet with 800 kp static thrust plus one BMW 3390 bifuel rocket (109-510) with 300-1,500 kp static thrust
Fuel tanks	Two of B4 petrol for the turbojet in the wings, one of M-Stoff and another of SV-Stoff in the fuselage
Armament	Two MG 151/20 under the pilot seat
Wingspan	9 m
Length	6.75 m.
Height	3 m.







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LIPPISCH P01-116

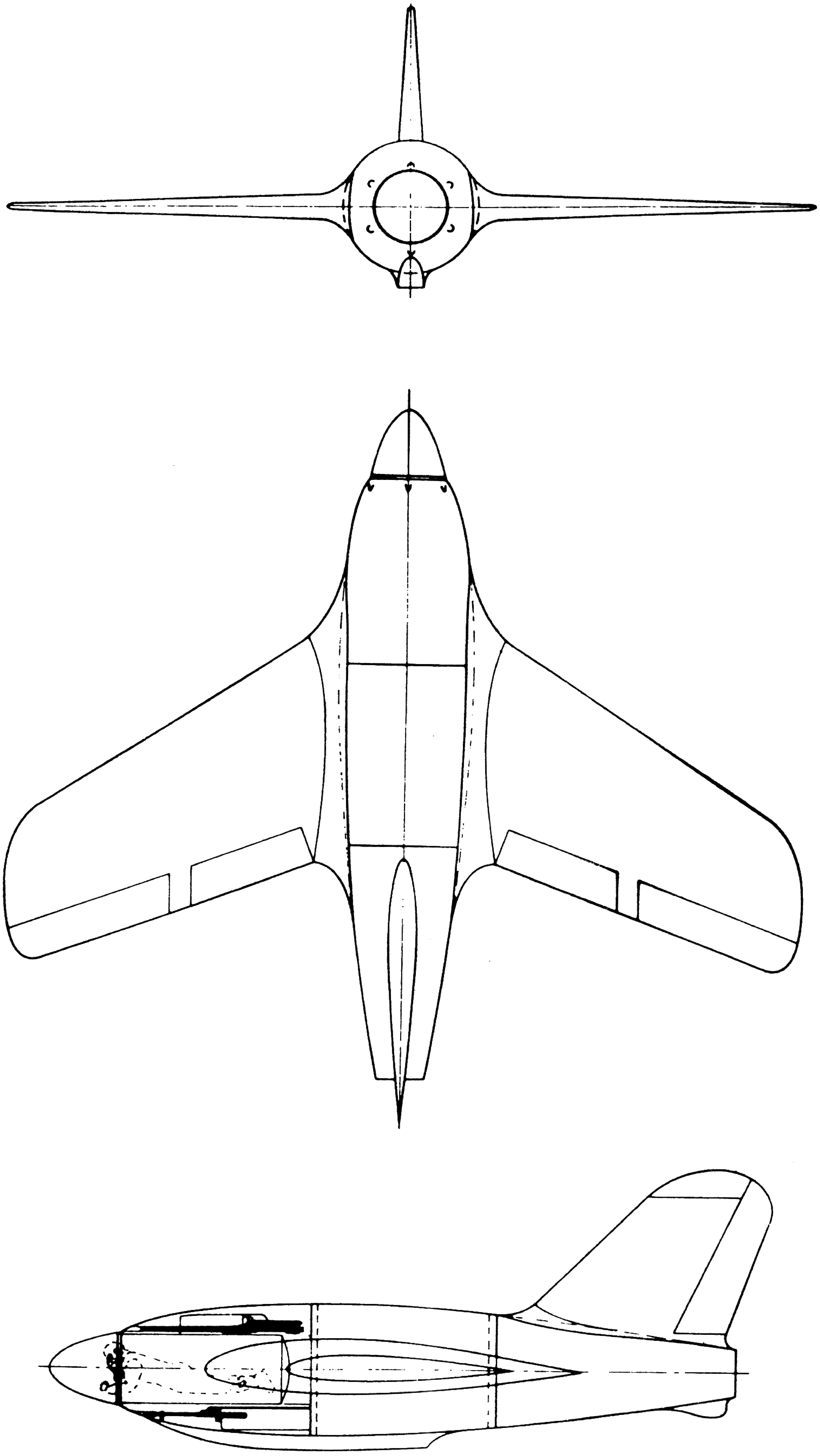
Lippisch P.01-116

Simplified version of the P01.115, without turbojet and with more room for the rocket fuel in the fuselage.

It was forseen the installation of a BMW 109-708 rocket with two combustion chambers (accelaration and cruise) for the 16 July 1941 design, instead of the variable-thrust rocket used in previous designs.

TECHNICAL DATA

Type	Rocket glider fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 109-708 bifuel rocket with two combustion chambers, one of 100 kp and another of 2,500 kp static thrust
Fuel tanks	One of R-Stoff and another and one of SV-Stoff in the fuselage
Armament	Two MG 151/20 under the pilot seat
Wingspan	9 m
Length	6.75 m.
Height	3 m.



1/72 scale

LIPPISCH P01-117

Lippisch P.01-117

Designed on 22 July 1941 as a high altitude interceptor with armoured and pressurised cockpit and more armament than in previous designs.

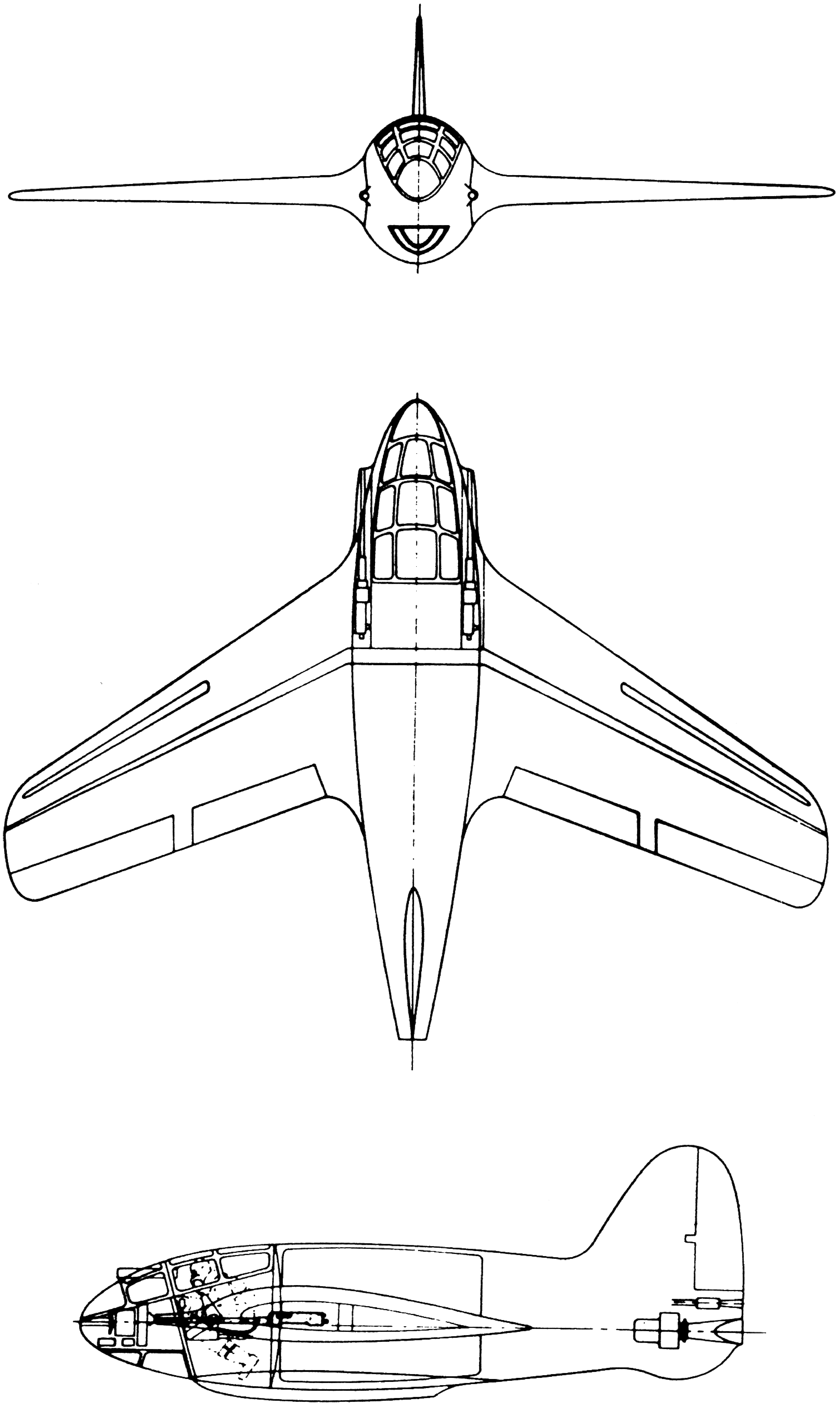
The pilot went in a prone position within a steel cylindrical container with a Plexiglas nosecone.

The engine was a Walter HWK 109-509 A.0 that would little afterwards be used to power the operational Me 163 B.

The higher consumption rate of the Walter rocket required a bigger and heavier design able to transport a higher fuel load.

TECHNICAL DATA

Type	High altitude rocket fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Armoured and pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One Walter HWK 109-509 bifuel rocket 1,500 kp static thrust
Fuel tanks	One of R-Stoff and another of Z-Stoff in the fuselage
Armament	Two MG 151/20 and four MG 131/13 around the cylindrical armoured cockpit
Wingspan	9 m
Length	7.65 m.
Height	3.4 m.



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LIPPISCH P01-118

Lippisch P.01-118

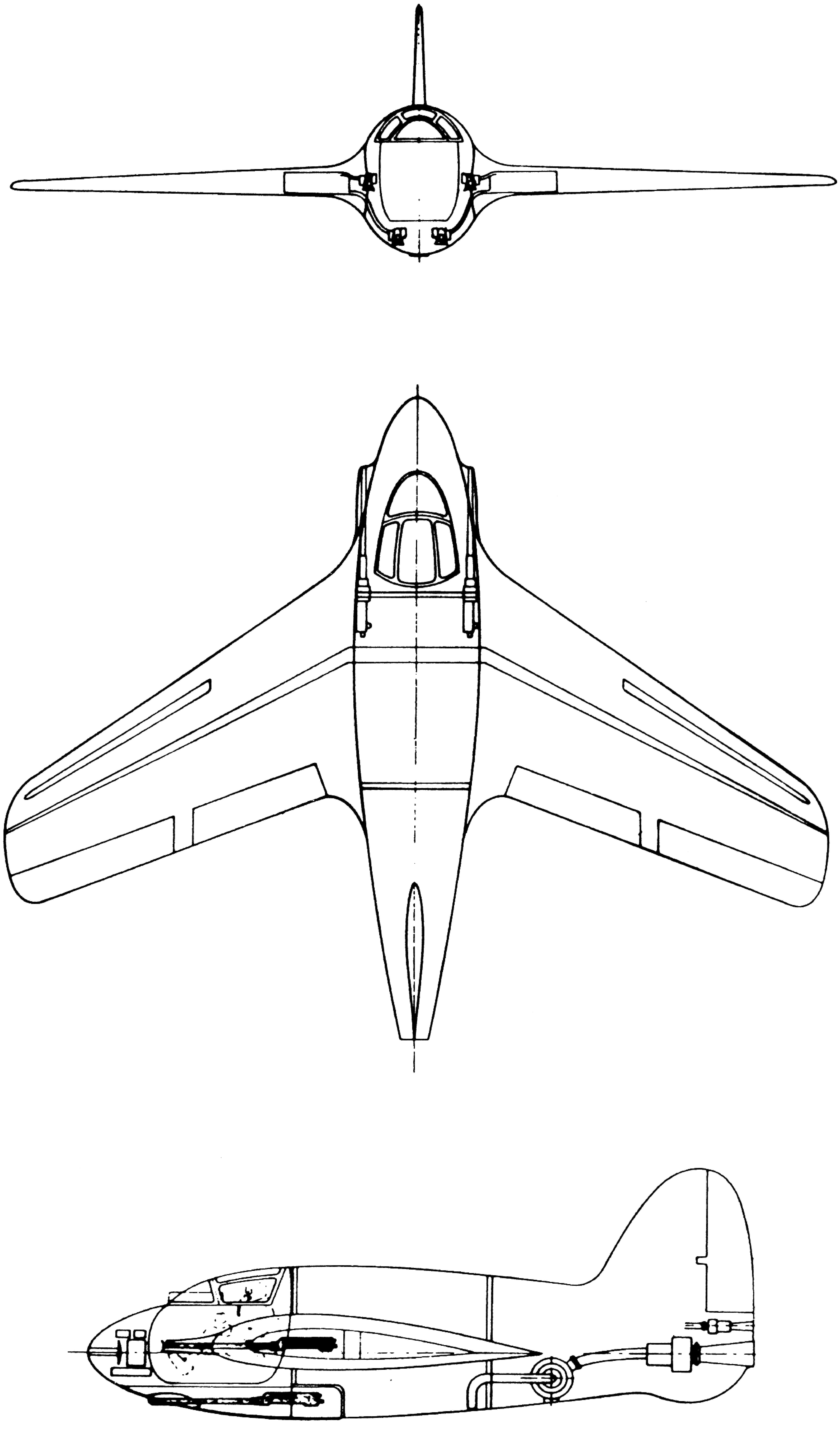
This 3 August 1941 design was equipped with very similar wings to those of the Me 163 B operational one.

The change in the pilot position and the glazed area under the cockpit make us think of a vertical takeoff design possibly inspired in the Von Braun "Interceptor II" of 27 May 1941.

The cockpit was equipped with an IR "Spanner" device similar to the one used by Von Braun in "Interceptor I" of 1939

TECHNICAL DATA

Type	Rocket fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 109-708 bifuel rocket with two combustion chambers, one of 100 kp and another of 2,500 kp static thrust
Fuel tanks	One of R-Stoff and another of SV-Stoff in the fuselage
Armament	Two MG 151/20 guns in the wing roots
Wingspan	9 m
Length	7.2 m.
Height	3 m.



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LIPPISCH P01-119

Lippisch P.01-119

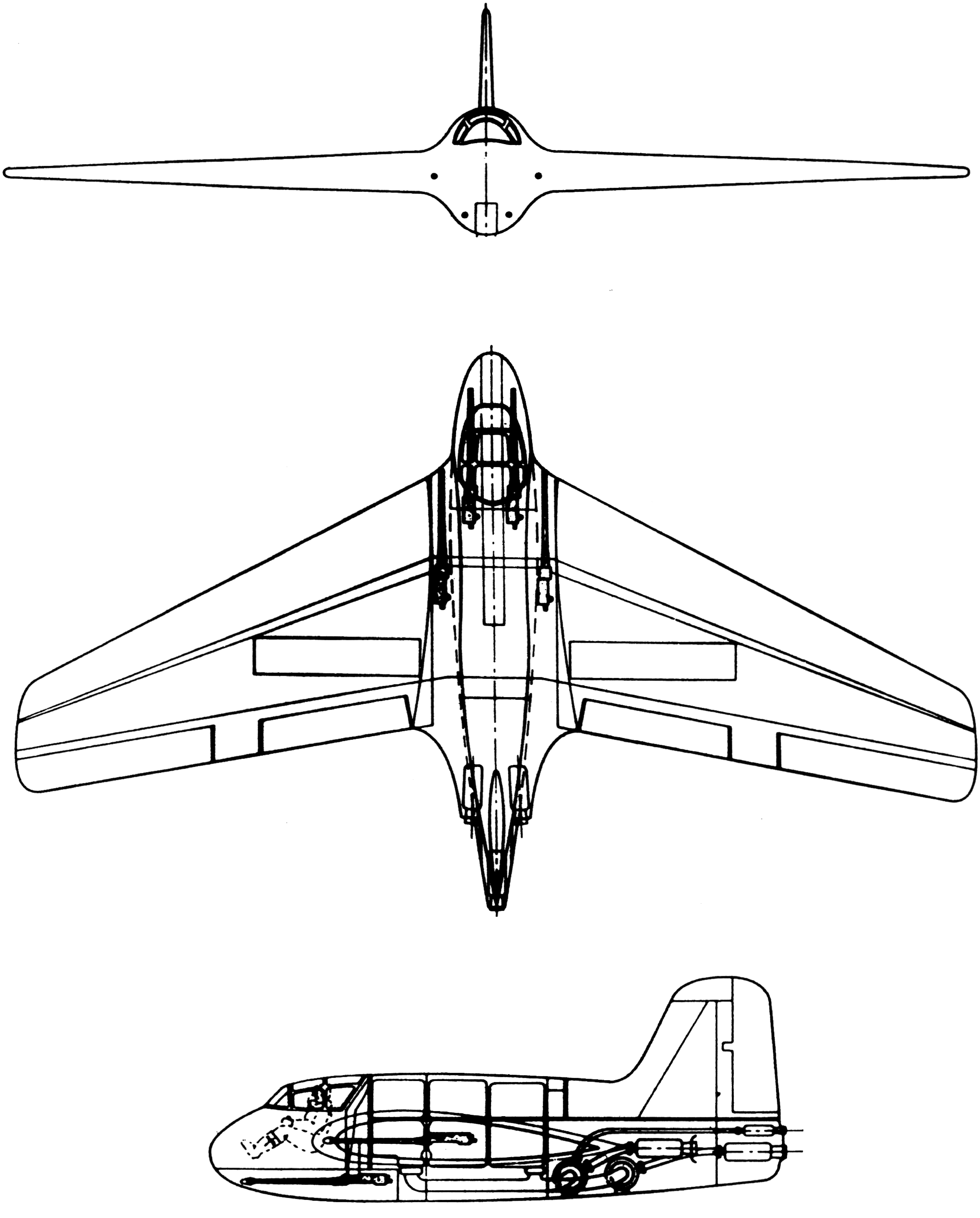
This 4 August 1941 design was an optimised variant of the P01.118 for high altitude flight.

It was equipped with a heavy armoured and pressurised cockpit and armed with four guns with great ammunition stores in the wing roots.

The cockpit was equipped with an IR "Spanner" device.

TECHNICAL DATA

Type	High altitude rocket fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	One BMW 109-708 bifuel rocket with two combustion chambers, one of 100 kp and another of 2,500 kp static thrust
Fuel tanks	One of R-Stoff and another of SV-Stoff in the fuselage
Armament	Four MG 151/20 guns, two in the wing roots and two under the pilot seat
Wingspan	9 m
Length	7.2 m.
Height	3 m.



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LIPPISCH P05 (August 1941)

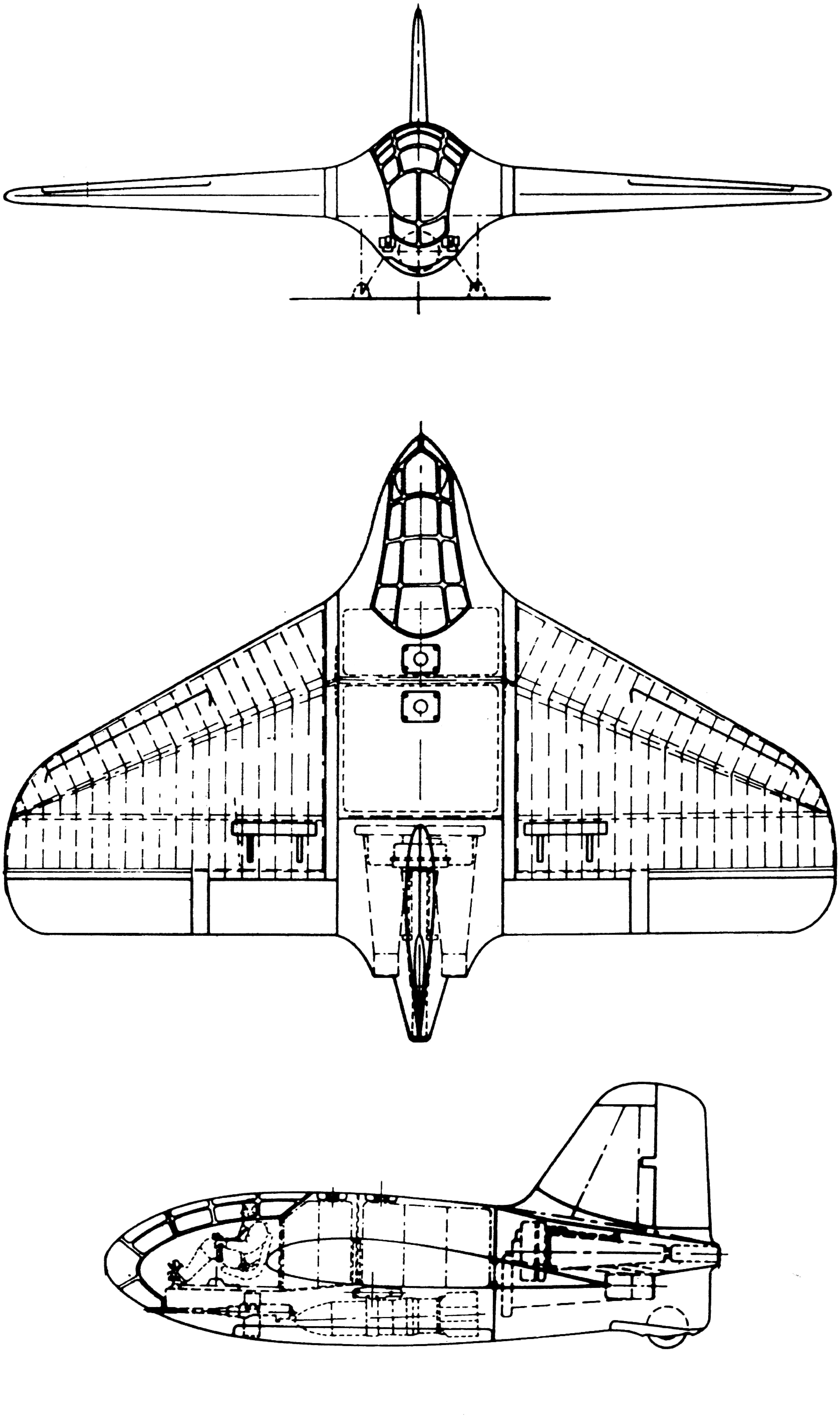
Lippisch P.05

Higher capacity variant of the P01.119 designed in August 1941 to the purpose of transporting armament and fuel. It was to be powered by three rockets

Two of the rockets, used to accelerate, were of the BMW 109-510 type. The third one had a double combustion chamber for acceleration and cruise flight and was of the BMW 109-708 type.

TECHNICAL DATA

Type	Rocket fighter
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Detachable trolley, retractable skid
Engine	Two BMW 109-510 bifuel rockets with 1,500 kp static thrust each and one BMW 109-708 bifuel rocket with two combustion chambers, one of 100 kp and another of 2,500 kp static thrust
Fuel tanks	One of M-Stoff and another of SV-Stoff in the fuselage
Armament	Four MG 151/20 guns, two in the wing roots and two under the pilot seat
Wingspan	12.8 m
Length	7.6 m.
Height	3.1 m.



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LIPPISCH P09 (May 1942)

Lippisch P.09

Rocket "Schnellbomber" designed in May 1942 as an alternative to the P09 (November 1941) powered by turbojets.

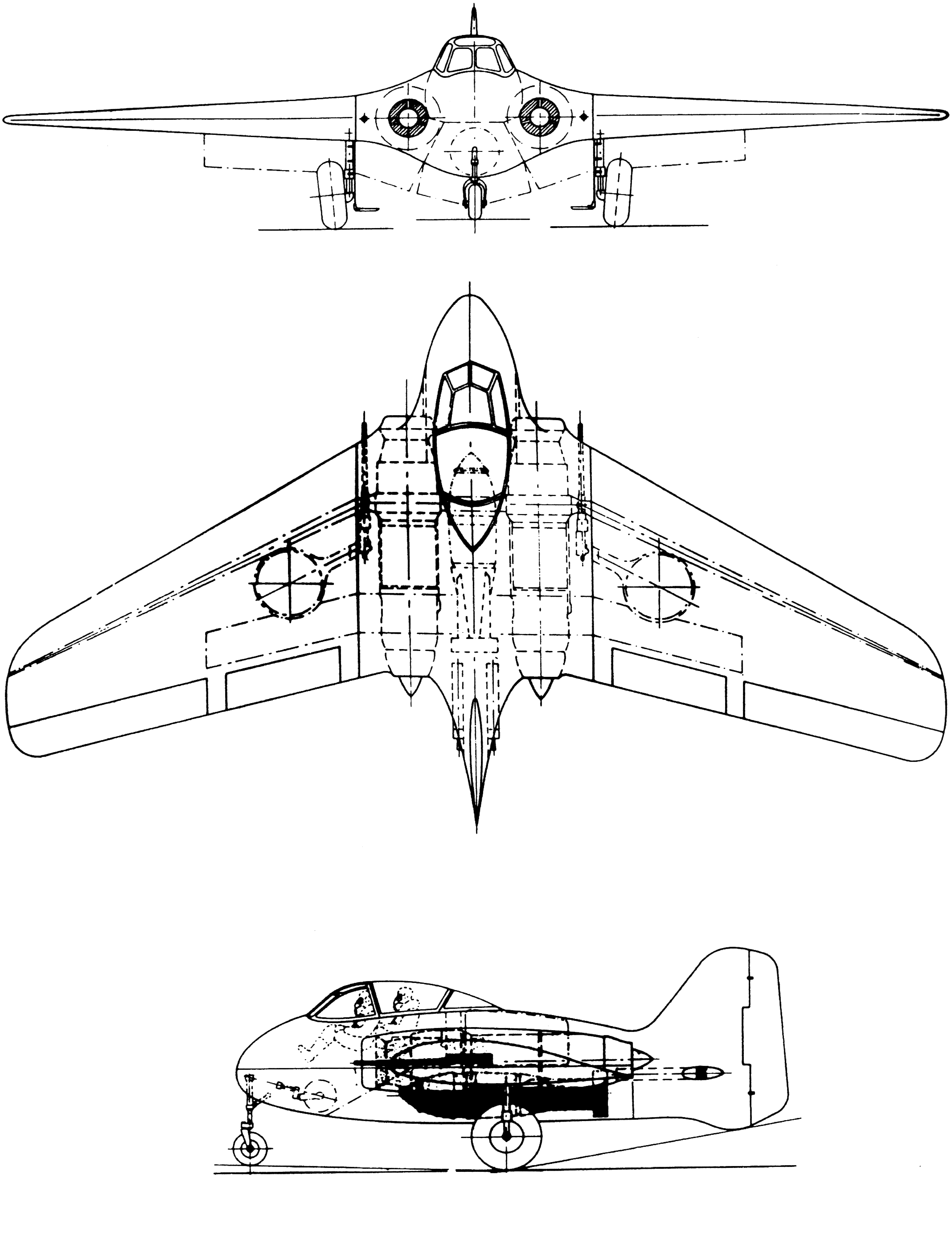
Powered by two Walter HWK 109-509 AO, it could launch 1,000 kg of bombs over the rearguard of the enemy without being intercepted.

The approach to the target would be absolutely silent with the engines stopped. It would be difficult to detect with the radar of the time, the airplane being built in wood and considering its stealth characteristics.

The take off and escape after launching the bombs was done with the help of the rockets.

TECHNICAL DATA

Type	Rocket Schnellbomber
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Detachable trolley, retractable skid
Engine	Two Walter HWK 109-509 AO bifuel rockets with 1,500 kp static thrust
Fuel tanks	One of R-Stoff and one of Z-Stoff in the fuselage
Armament	Two MG 151/20 guns under the pilot seat and up to 1,000 kg of bombs in a ventral bay.
Wingspan	10 m
Length	7.4 m.
Height	3.1 m.



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LIPPISCH P11 (September 1942)

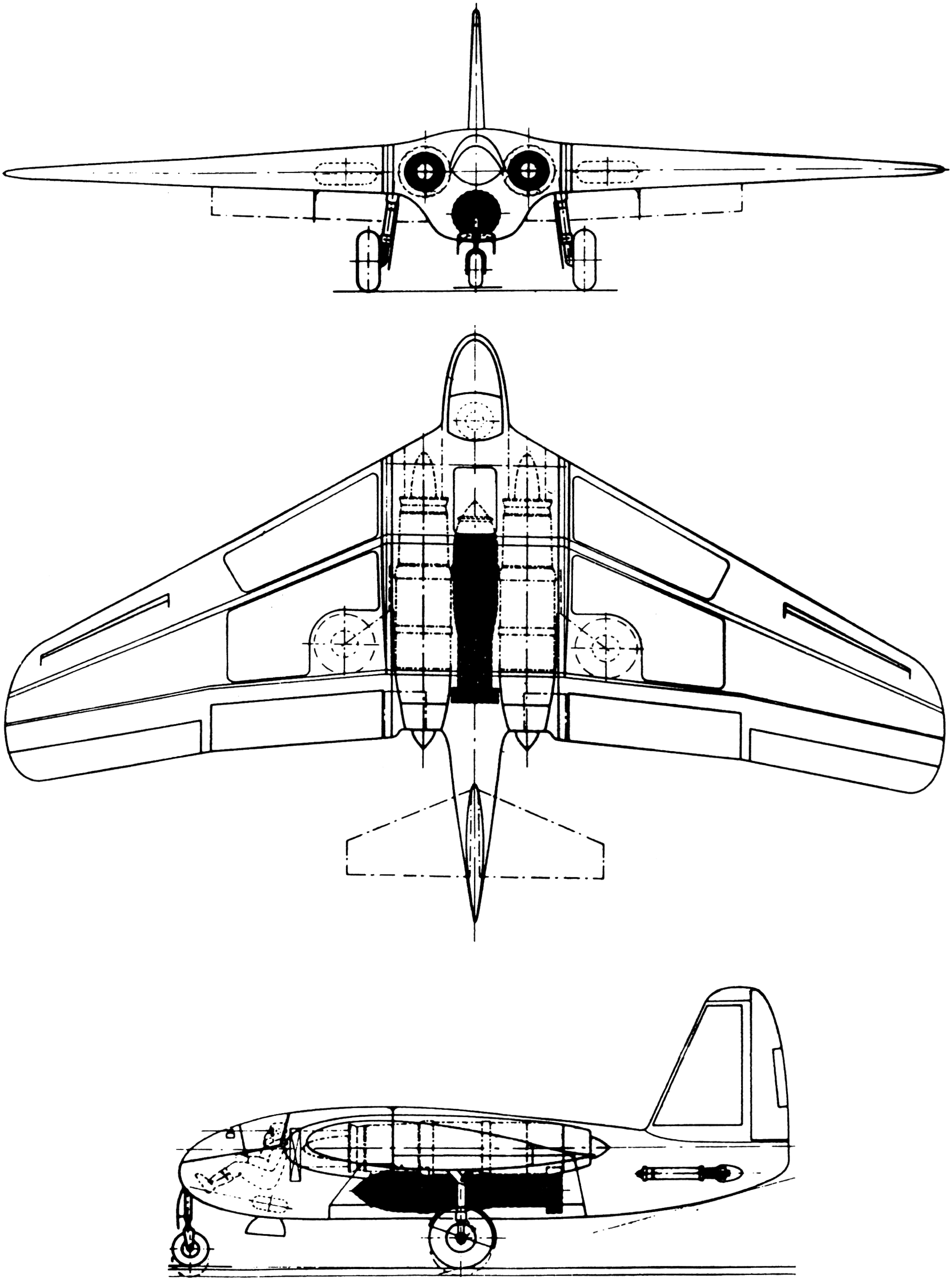
Lippisch P.11 (September 1942)

Variant of the twin jet Schnellbomber P09 with tricycle landing gear and widened cockpit to house a crew of two.

It was powered by two Jumo 004C and two Scmidding 109-553 rockets of solid fuel to help during take off or to escape at a higher speed after launching the bombs.

TECHNICAL DATA

Type	Twin jet Schnellbomber
Phase	Windtunnel model
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Tricycle type
Engine	Two Jumo 004C of 1,010 kp static thrust each plus two solid fuel Shmidding 109-553 with 1,750 kp static thrust each
Fuel tanks	Two of J2 petrol in the fuselage
Armament	Two MG 151/20 guns in the wing roots and up to 1,000 kg of bombs in a ventral bay.
Wingspan	13 m
Length	7.5 m.
Height	3.5 m.



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LIPPISCH P11 (December 1942)

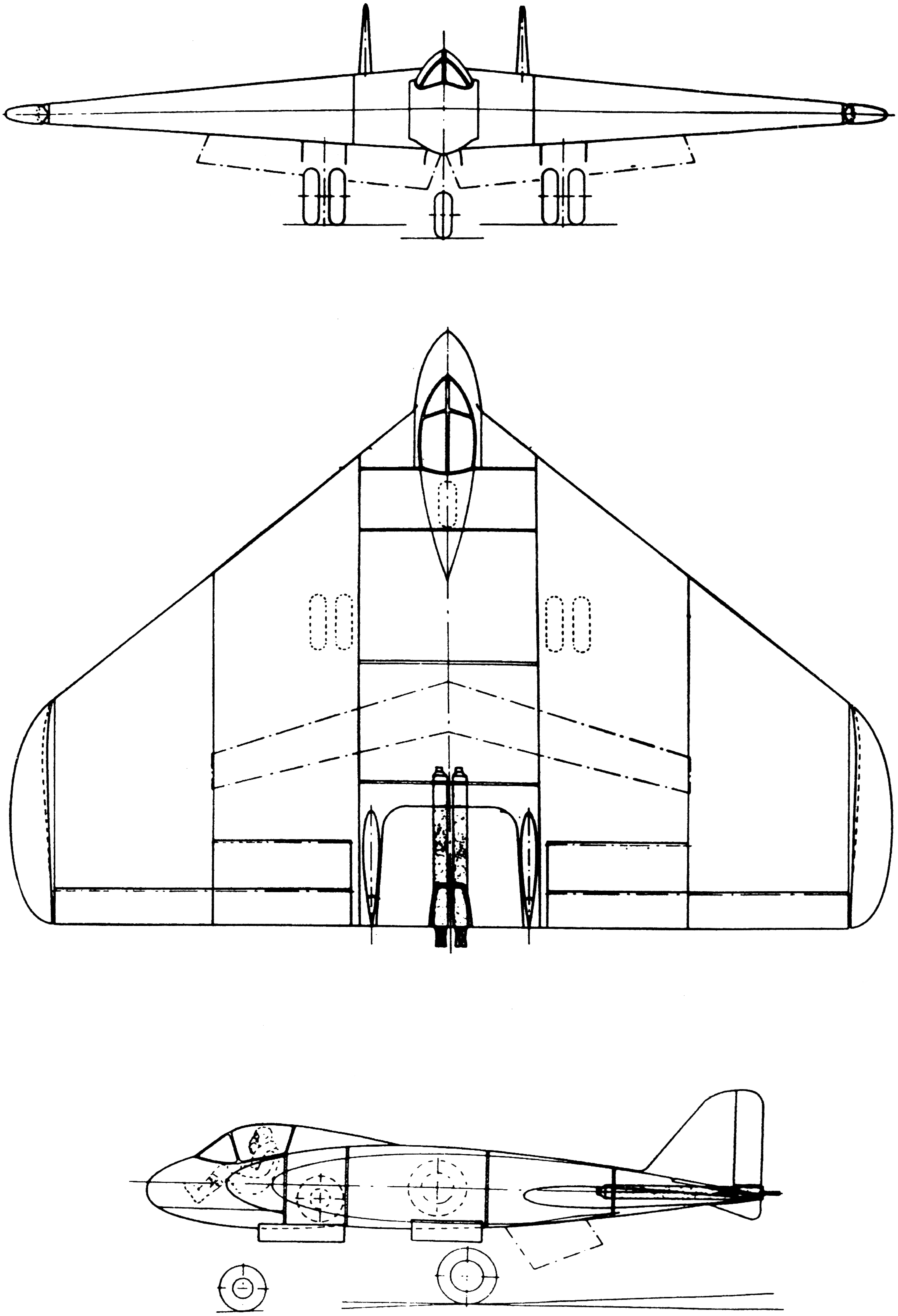
Lippisch P.11 (December 1942)

Improved version, with regards to the September 1942 one, with the addition of four fuel tanks in the wings and the removing of one of the crew and the defensive armament.

The tailfin was fitted with a foldable horizontal stabiliser to facilitate the low altitude and high speed flight.

TECHNICAL DATA

Type	Twin jet Schnellbomber
Phase	Windtunnel model
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding. Pressurised cockpit
Landing gear	Tricycle type
Engine	Two Jumo 004C of 1,010 kp static thrust each plus two solid fuel Schmmiding 109-553 with 1,750 kp static thrust each
Fuel tanks	Two of J2 petrol in the fuselage and four in the wings
Armament	1,000 of bombs.
Wingspan	12.65 m
Length	8.14 m.
Height	4 m.



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LIPPISCH P11 (December 1943)

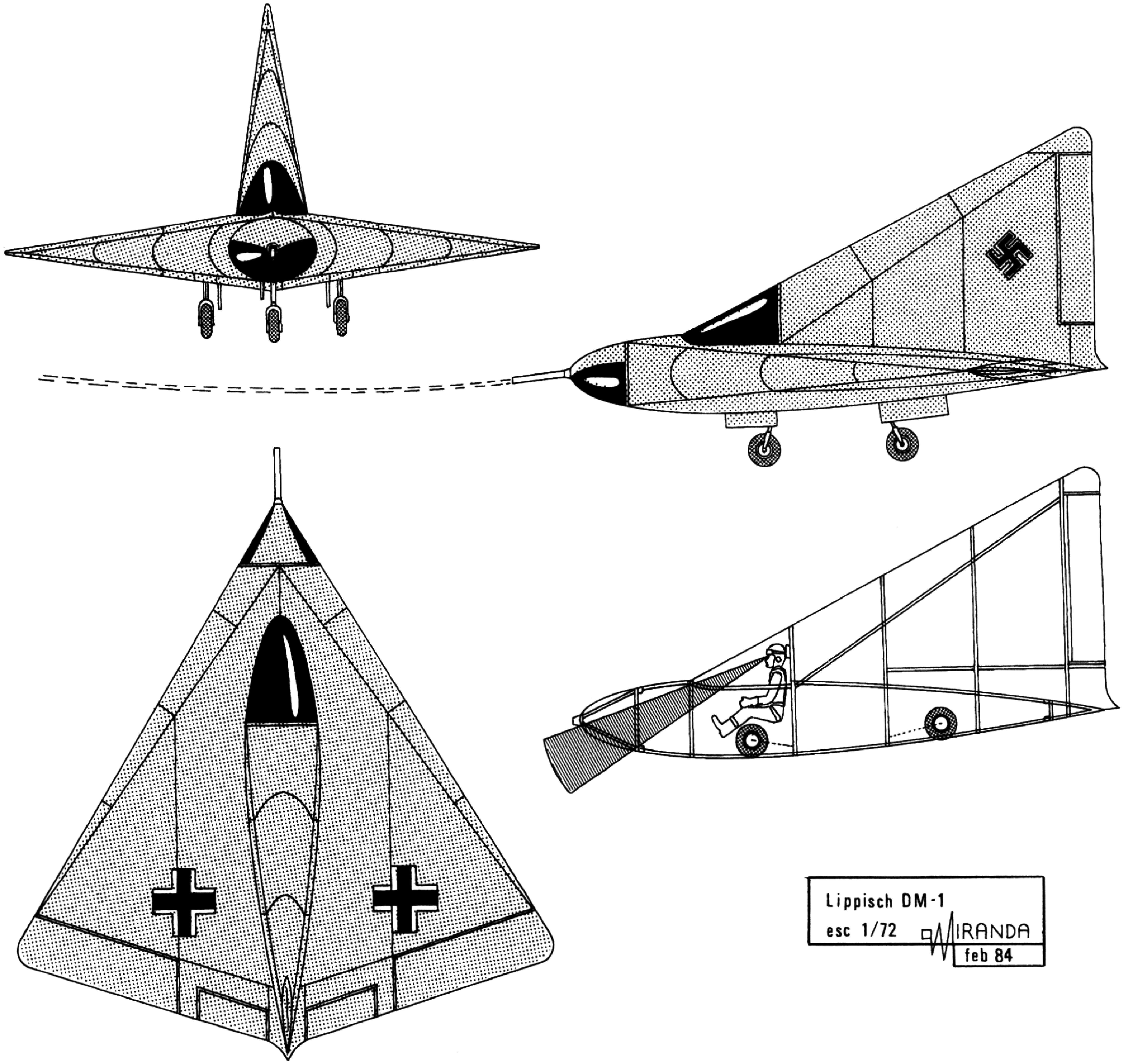
Lippisch P.11 (December 1943)

Last design of the P11 series. It was a polivalent combat aircraft able to act as fighter, zerstörer and fighter bomber.

It kept the fast take off capacity from previous designs thanks to four Schmidding rockets installed between the main engines.

TECHNICAL DATA

Type	Twin jet fighter bomber
Phase	Prototype construction
Wings	Wooden structure and plastic cladding
Fuselage	Wooden structure and plastic cladding
Landing gear	Tricycle type
Engine	Two Jumo 004B of 900 kp static thrust each plus four solid fuel Schmmiding RI-503 rockets of 2,000 kp static thrust each
Fuel tanks	Two of J2 petrol in each wing
Armament	Two Mk 103 guns in the wings
Wingspan	10.8 m
Length	7.48 m.
Height	2.76 m.
Wing area	50 m^2
Maximum weight	8,000 kg
Maximum speed	1,040 km/h
Ceiling	10,000 m
Range	3,000 km.



Lippisch DM-1
esc 1/72 MIRANDA
feb 84

LIPPISCH DM.1

Most part of the research done by Lippisch during the war was aimed to obtain delta wings apt for an stable and long range supersonic flight.
This meant that they should reach and surpass Mach 1 in horizontal flight using very powerful engines and that they should have a great sweep.

It was feared at the time that the behaviour of these type of wings should be dangerous during landing at a very low speed. To analyse these questions, a test glider named DM.1 was built in 1945 with the cooperation of the FFG Darmstadt and the FFG München in 1945.
It was a delta wing, with a 60° leading edge and -15° on the trailing edge. The cockpit was built inside the tailfin, that should be transported in Mistel configuration over a Siebel Si 204A and carried to an altitude of 8,000 m.
It was expected to reach 800 km/h powered by a Schmidding 109-533 rocket of 1,000 kp and 560 km/h in unpropelled flight. The landing speed was to be 72 km/h at 35 degrees of AOA.

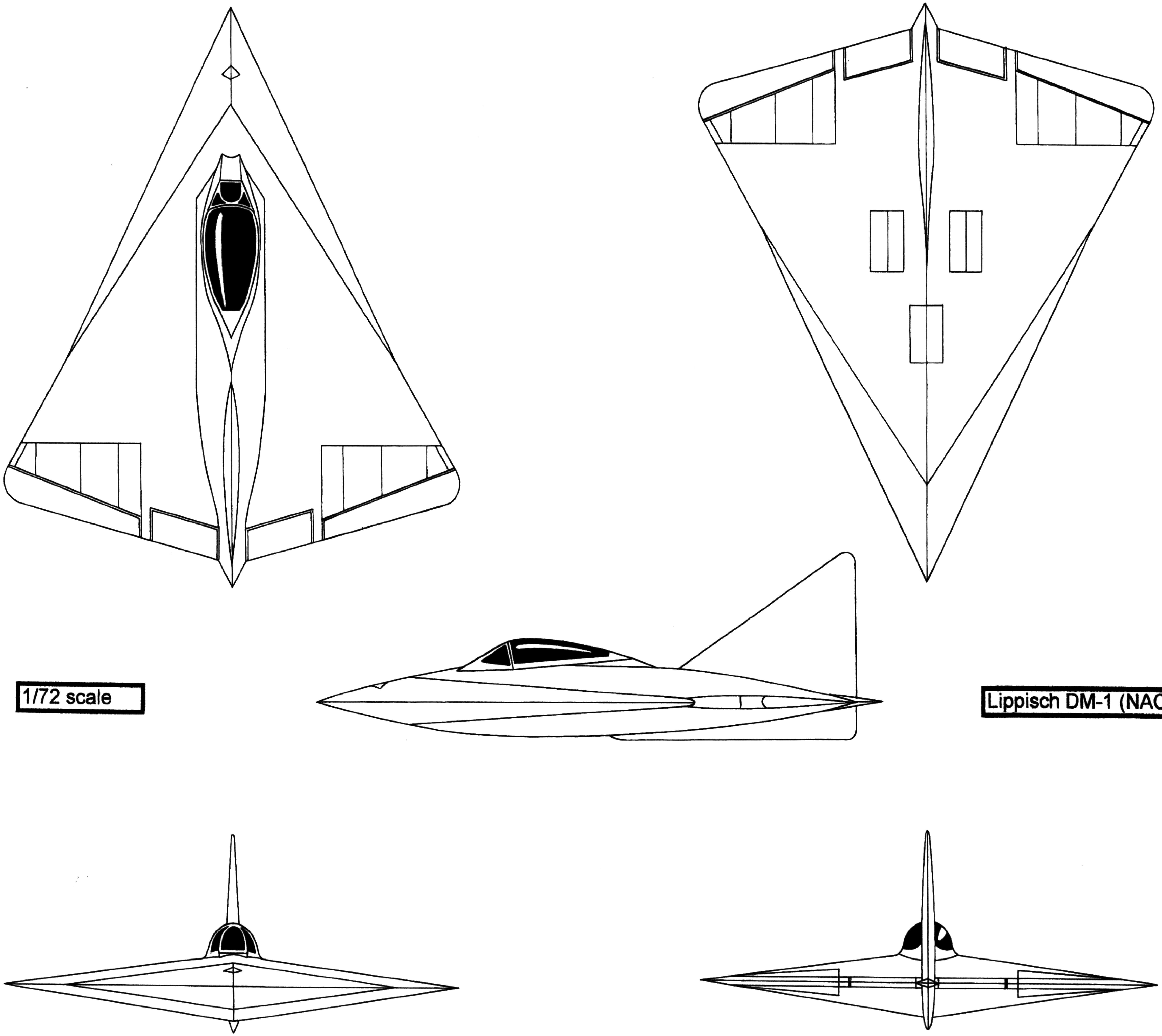
After the war, the DM.1 was moved to USA where its development was continued with the Scientific Advisory Group of the USAF under the direction of professor Theodore Von Kármán in the NACA and in the windtunnel of Langley.
During the static tests, different configurations of cockpits and tailfins and several types of new leading edges were tested. They were trying to find out why the Reynolds coefficient -measuring the relative viscosity of the air flow at high speed- was too high.

The final version was named NACA #8 and had a new leading edge with sharp edges and 64.2 degrees, a buble cockpit and a triangular tailfin of 15% thickness and 35° swept. It was declared stable at supersonic speed but, due to its small size, it would not have been able to transport enough fuel if a rocket engine necessary to reach Mach 1 would have been installed.

TECHNICAL DATA

Type	Aerodynamic test glider
Phase	Flying test
Wings	Wood Structure and cladding. 60° swept
Fuselage	Wood structure and cladding
Landing gear	Tricycle type
Engine	A Schmidding 109-533 rocket with 1,000 kg of thrust
Wingspan	6 m
Length	6.32 m
Height	3.25 m
Wing area	19.9 m^2
Maximum weight	460 kg (glider)
Maximum speed	800 km/h (rocket)

MIRANDA



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Lippisch DM-1 (NACA #8)

LIPPISCH DM.1 (NACA #8)

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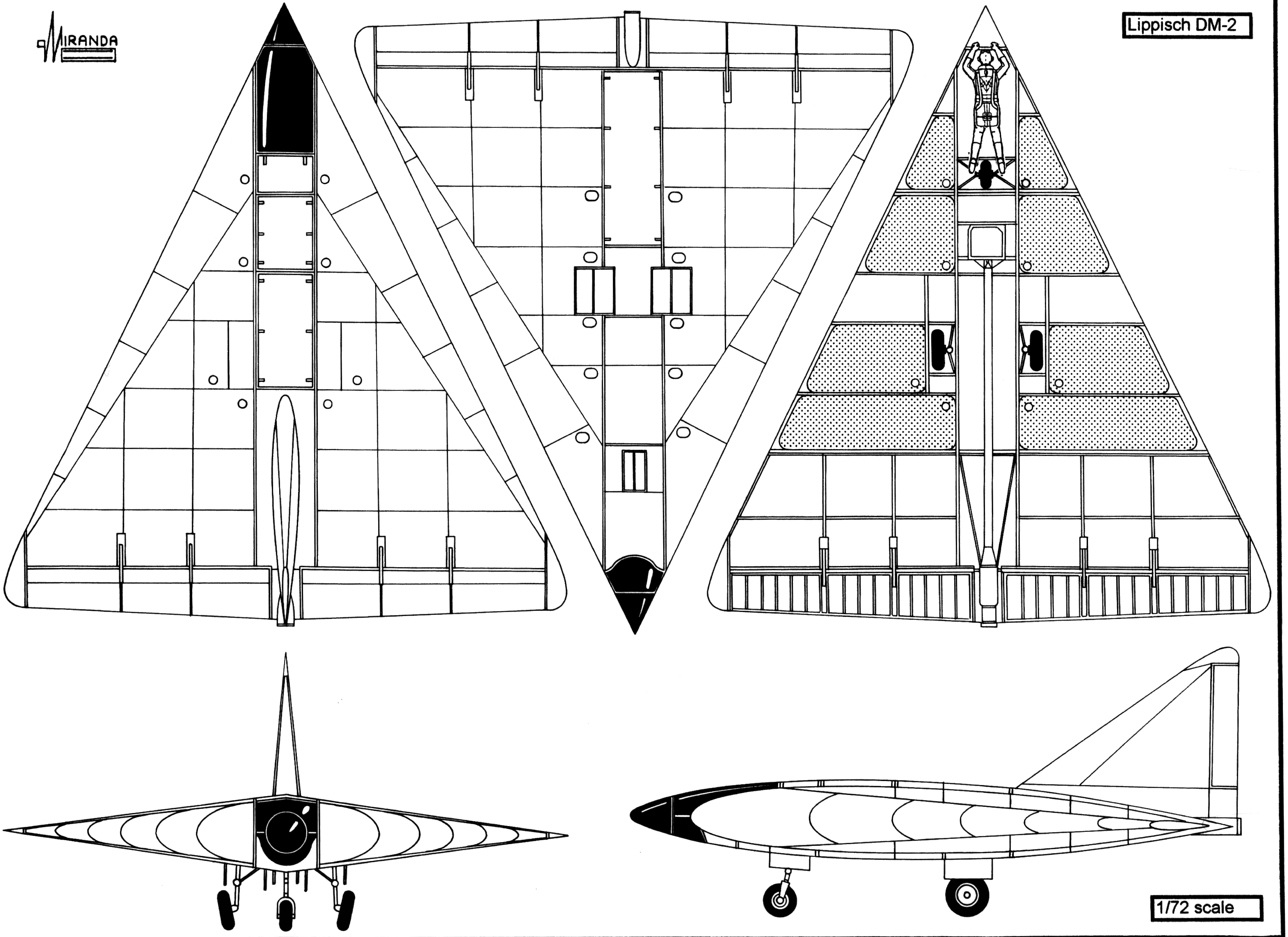
TECHNICAL DATA

Type	Windtunnel model
Phase	Aerodynamic test
Wings	Wood Structure and cladding. 60°/64.2° swept
Fuselage	Wood structure and cladding
Landing gear	None
Engine	None
Wingspan	6 m
Length	7.34 m
Height	2.37 m


Lippisch DM-2
1/72 scale
MIRANDA

LIPPISCH DM.2

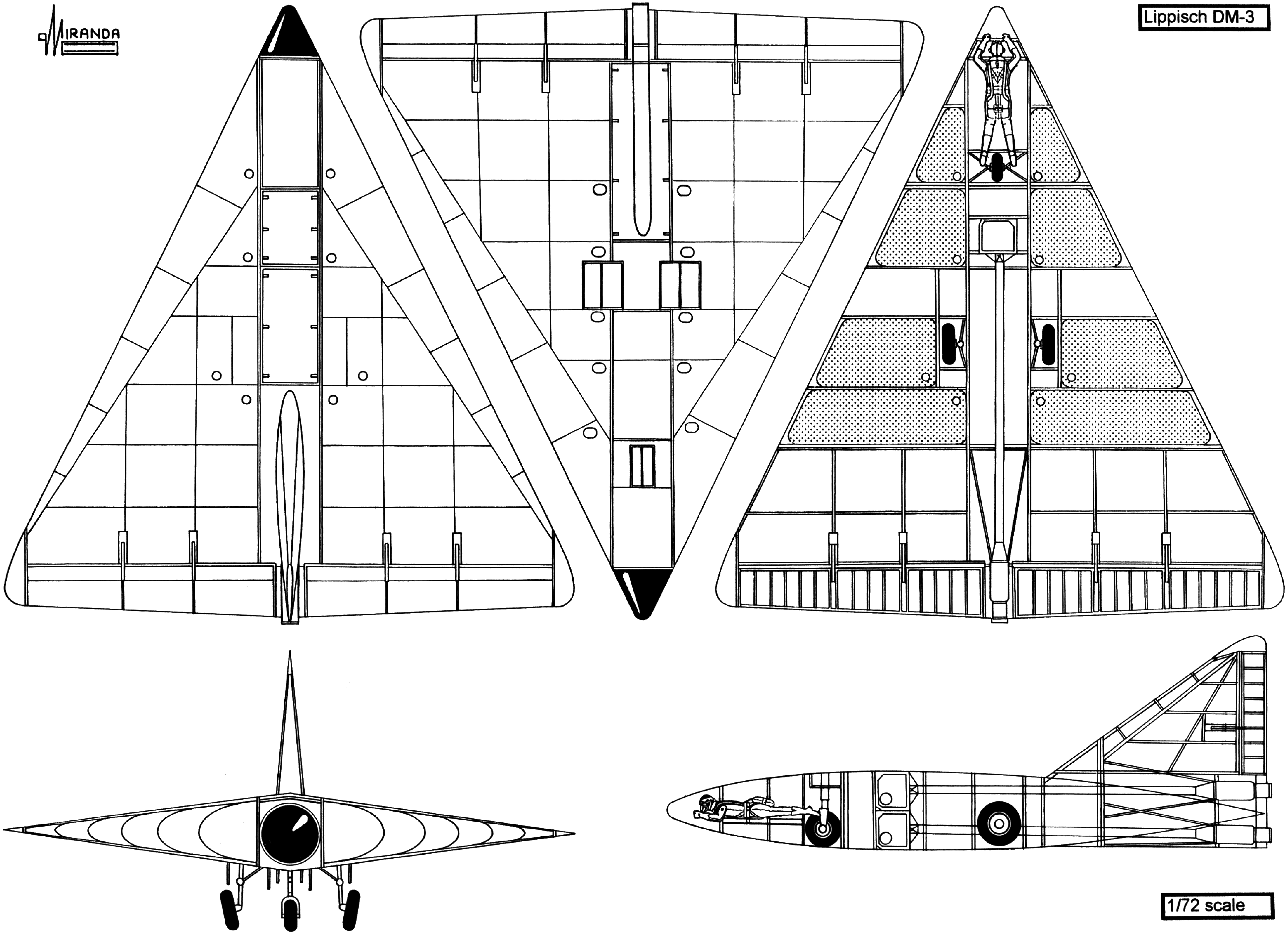
Although aerodynamically suited to reach transonic speed, the DM.1 was not big enough to house the required fuel for the rocket.
The DM.2 was designed for powered flight, a 150% bigger than the DM.1 and with twice the fuel of a Me 163 Komet.

In the February 1945 design, the airplane was fitted with a HWK 509 A-1 rocket able to work during 17 minutes with a static thrust of 1,600 kp. It was expected that should be enough to study its behaviour during flight in the region between 0.8 and 1.2 Mach

Fully loaded ,the airplane was too heavy to take off using the frail landing gear that appears on the designs. It was probably transported up to 8,000 m. by an airplane of the Ju 390 or He 274 type and then launched from there to save rocket fuel.

TECHNICAL DATA

Type	Transonic rocket plane
Wings	64.2 degrees sweep at the leading edge and -3 degrees at the trailing edge, 12% thickness at root, delta planform with elevons. Metallic structure and cladding.
Tailfin	36 degrees sweep, 12% thickness, metallic structure and cladding
Fuselage	Housing the cockpit, with the pilot in a prone position, the forward landing gear and the rocket-engine. Metallic structure and cladding
Landing gear	Tricycle type, similar to the DM-1 one
Engine	One Walter HWK 509 A-1 with an static thrust of 1,600 kp
Fuel tanks	Two of T-Stoff of 765 lt. and two more of 430 lt. in the wings, behind the main spar
Armament	None
Measures	
Span	8.25 m
Length	8.94 m
Height	4.12 m
Wing area	38 m^2
Empty weight	3,700 kg.
Take-off weight	11,500 kg
Maximum speed	1.2 Mach
Service ceiling	12,000 m.
Range (max. powered endurance)	17 min


Lippisch DM-3
1/72 scale

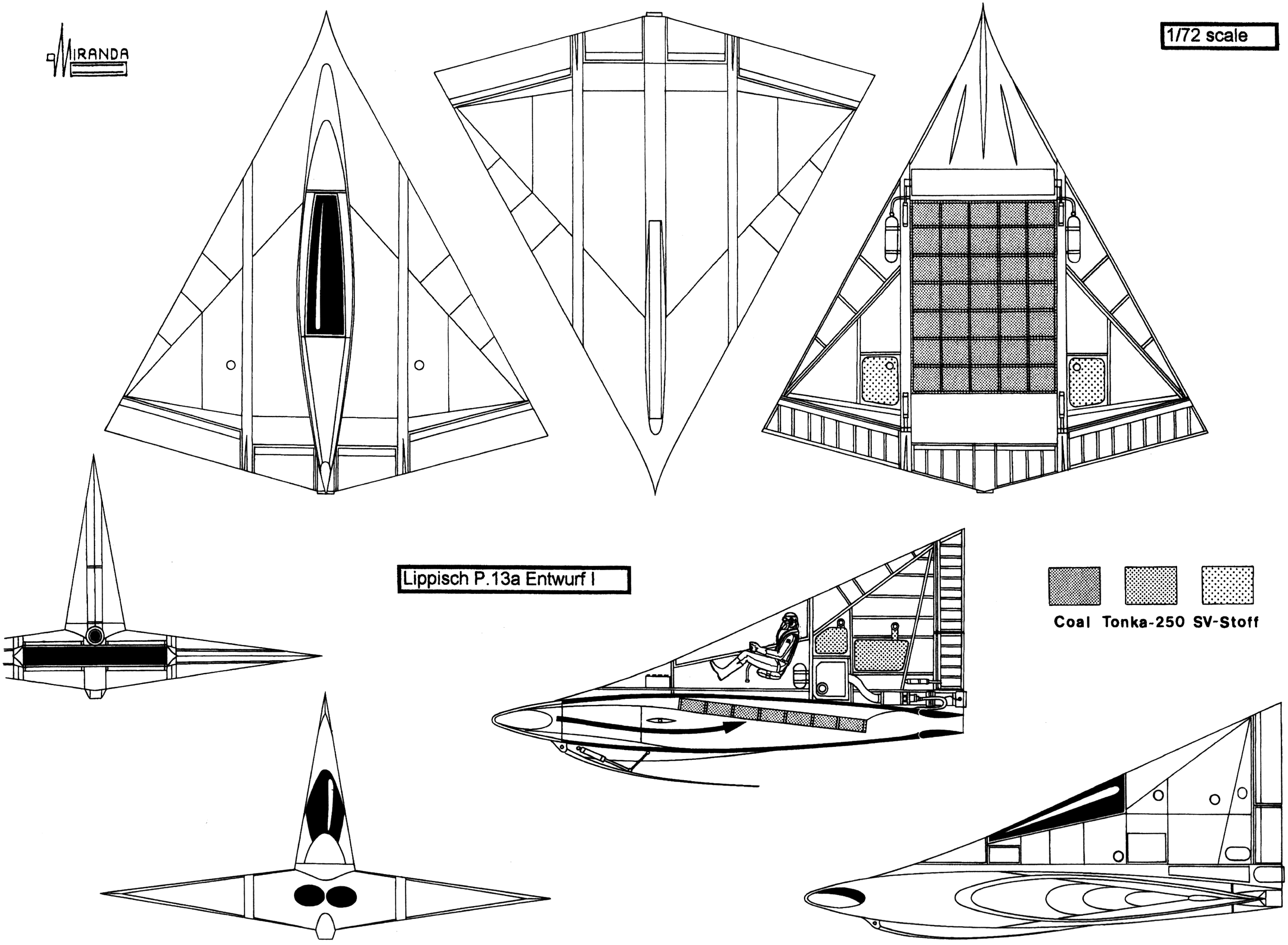
LIPPISCH DM.3

Designed at the same time than the Lippisch DM.2, the DM.3 was an airplane powered by two Walter 509 rockets with a pressurised cockpit, being the rest identical to the DM.2.

The plan was to launch it from a bomber at 8,000 m. of altitude in a similar way to the American Bell X-1 and after firing both rockets, the airplane would go above 20,000 m. very fast. It stayed there until reaching a speed of 2.5 Mach and then had enough fuel left for 8 minutes of powered flight.

TECHNICAL DATA

Type	Supersonic rocket plane
Wings	64.2 degrees sweep at the leading edge and -3 degrees at the trailing edge, 12% thickness at root, delta planform with elevons. Metallic structure and cladding.
Tailfin	36 degrees sweep, 12% thickness, metallic structure and cladding
Fuselage	Housing the pressurised cockpit, with the pilot in a prone position, the forward landing gear and the rocket-engine. Metallic structure and cladding
Landing gear	Tricycle type, similar to the DM-1 one
Engine	Two Walter HWK 509 A-1 with an static thrust of 1,600 kp each
Fuel tanks	Two of T-Stoff of 765 lt. and two more of 430 lt. in the wings, behind the main spar
Armament	None
Measures	
Span	8.25 m
Length	8.85 m
Height	4.12 m
Wing area	38 m^2
Empty weight	3,870 kg.
Take-off weight	11,670 kg
Maximum speed	2.5 Mach
Service ceiling	more than 30,000 m.
Range (max. powered endurance)	8 min



Lippisch P.13a Entwurf I

1/72 scale

LIPPISCH P.13a Entwurf I

The petrol shortage suffered by Germany during the last year of the war led scientists and engineers to experiment with alternative fuels.

Dr. K. Wahl, of the Kirchheim Technische Institut, made a Lorin ramjet work with coal dust fuel. and the idea was adopted by Lippisch for his P.13 project.
A burner prototype was built to that effect. Within it, a brown coal tablet should burn in the middle of a strong wind flow.
The tablet, formed by a suspension of coal dust in a pressurised inflammable petroleum foam, should be carried in a wire mesh container set in the duct at a small angle (6°) with the air stream. It measured 265 x 200 x 15 cm and weighted 670 kg.

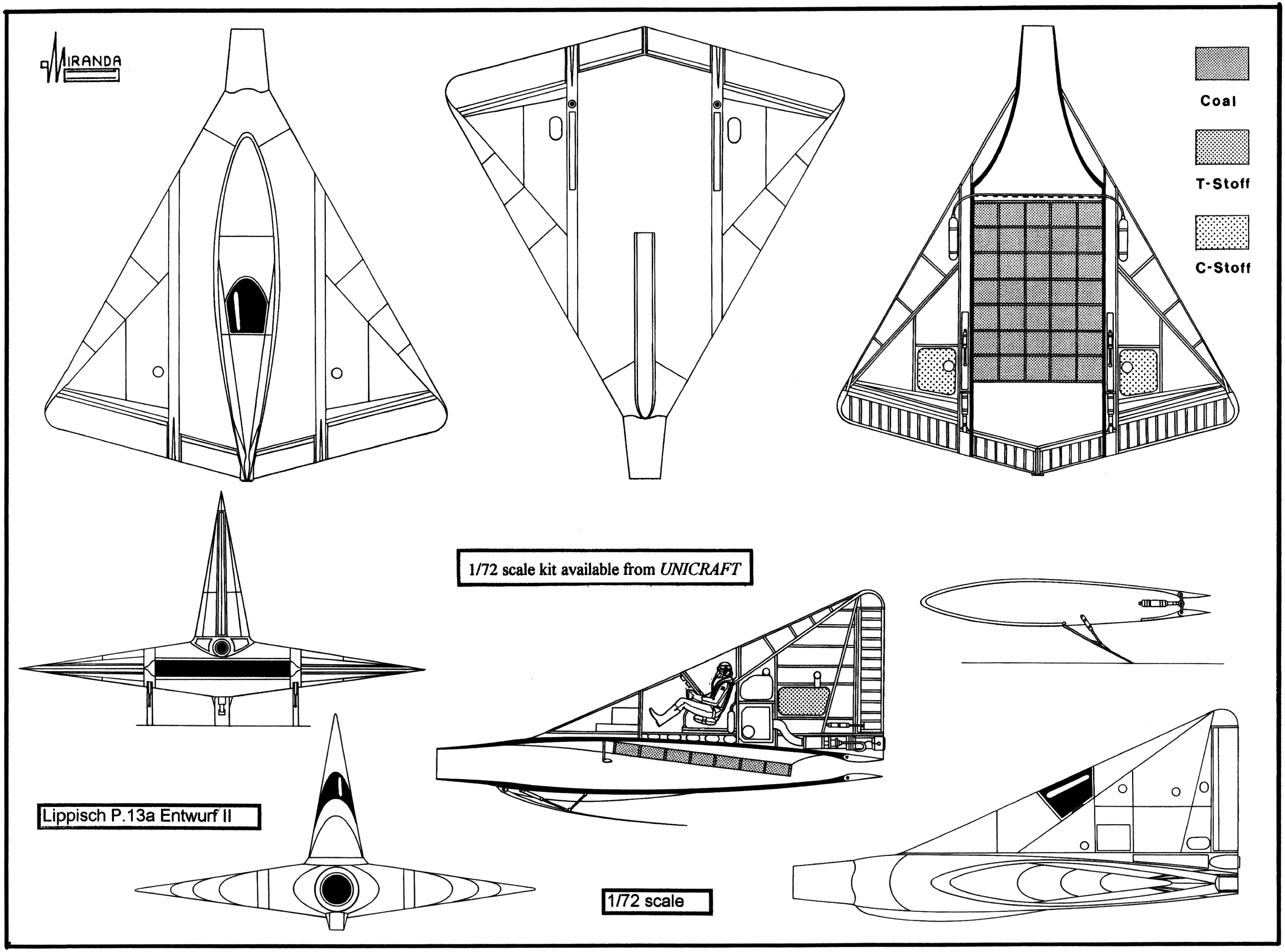
The P.13 was named P.13a Entwurf I on its first configuration (The P.13b would be a scaled-up reconnaisance version). It would have triangular wings, based on the P.12 Entwurf IV ones, and a tailfin housing a cockpit for the pilot, similar to the one in the P.12 Entwurf I but with pointed tips instead of rounded ones.

The air came into the combustion chamber through two oblique air intakes fitted with deflector vanes. It was then guided by an hydraulically operated flap towards the upper part of the carbon tablet, already burning thanks to a gas burner.

The air was forced to run through the whole surface of the tablet spreading the combustion, thus increasing its volume and temperature and converting it into carbon dioxide. Afterwards, the air went to an expansion chamber and was expelled through a rectangular nozzle fitted with hydraulically operated flaps.
The burning speed (320 km/h) was acomplished by means of a Walter rocket located at the base of the tailfin.

TECHNICAL DATA

Type	Supersonic ramjet-powered plane	
Wings	60 degrees sweep at the leading edge (15 degrees at the trailing edge) 12% thickness at root, delta planform with elevons. Metallic structure and cladding.	
Tailfin	66 degrees sweep, 17.5% thickness at root housing the pressurised cockpit, the T-Stoff tanks and the Walter rocket.	
Landing gear	Formed by a central skid hydraulically retractable.	
Engine	One solid fuel ramjet with more than 60,000 h.p. of power and a bi-fuel Walter HWK 109-509 S2 rocket with 1,993 kp of static thrust.	
Fuel tanks	One of T-Stoff and 170 lt. in the tailfin and two more of C-Stoff and 155 lt. in the wings	
Measures		
Wingspan		6.3m
Length		6.8 m
Height		3.4 m
Wing area		21 m^2



1/72 scale kit available from *UNICRAFT*

Lippisch P.13a Entwurf II

1/72 scale

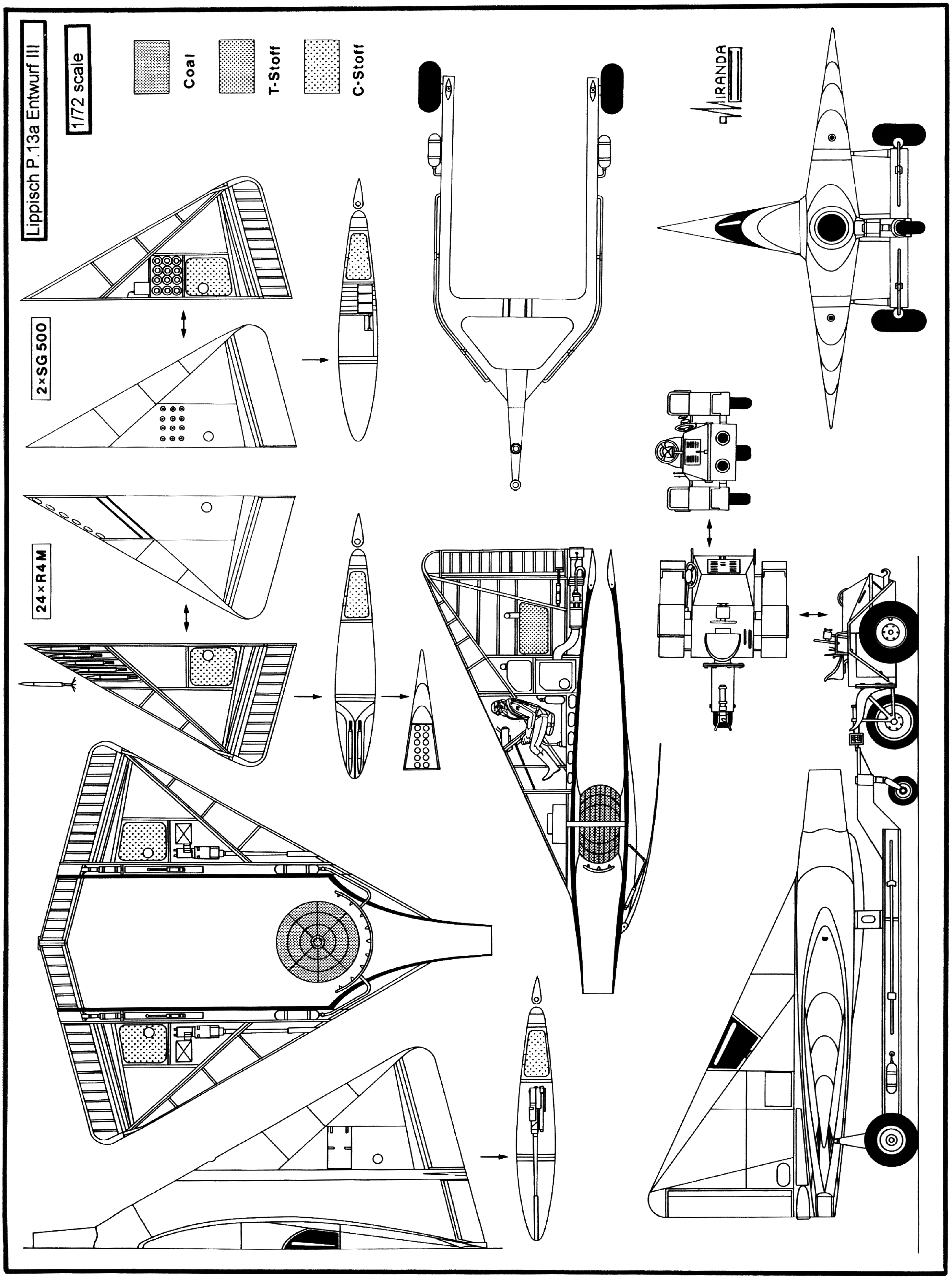
LIPPISCH P.13a Entwurf II

As already happened with the LP12, the windtunnel tests performed with the Entwurf I proved that the deflectors and the flap located within the air duct produced too much drag. This conclusion led to the LP 13a Entwurf II version, with an air intake based on the LP12 Entwurf I, rounded wingtips and tailfin tips and a cockpit with improved visibility.

A reduced scale airmodel named LP 12/13 was also built to test the new ramjet in flight. It was dicovered that the slope of the tablet produced too much drag and that the combustion geometry was not the right one.

TECHNICAL DATA

Type	Supersonic ramjet-powered plane
Wings	60 degrees sweep at the leading edge (15 degrees at the trailing edge) 12% thickness at root, delta planform with elevons. Metallic structure and cladding.
Tailfin	66 degrees sweep, 17.5% thickness at root housing the pressurised cockpit, the T-Stoff tanks and the Walter rocket.
Landing gear	Formed by a central skid and two more at the wing roots. All of them hydraulically retractable.
Engine	One solid fuel ramjet with more than 60,000 h.p. of power and a bi-fuel Walter HWK 109-509 S2 rocket with 1,993 kp of static thrust.
Fuel tanks	One of T-Stoff and 170 lt. in the tailfin and two more of C-Stoff and 155 lt. in the wings
Measures	
Wingspan	6m
Length	6.7 m
Height	3.25 m
Wing area	20 m^2


Lippisch P.13a Entwurf III
1/72 scale
Coal
T-Stoff
C-Stoff
2×SG 500
24×R4M
MIRANDA

LIPPISCH P.13a Entwurf III

The LP13a Entwurf II was fitted with a new type of burners -that would hopefully be production version- being renamed LP13a Entwurf III.
The main modification consisted of changing the tablet for an oval axial section block of 800 kg - housed in a wire mesh circular basket with the same section -within the duct and positively rotated about its vertical axis at some 60 r.p.m. by means of an electric engine.
Combustion is initiated by a gas burner and liquid fuel may employed to facilitate the start up.
The coal used took the form of small granules and not irregular lumps as previously, since granules produced a more controlled and even burn.

The system was tested in the LFW of Vienna before the end of the war and it worked fine. It was expected that the new engine would have a power higher than 60,000 h.p. -achieved by the Sänger ramjets of liquid fuel- and a range of 45 minutes of powered flight.

The operational routine of the LP13 was very similar to the Komet one. A jettisonable trolley and a Walter rocket -working during three minutes- helped during the takeoff. The ramjet automatically started at 320 km/h, then the plane went upward in a 45° angle until reaching an operational altitude of 30,000 m where it would surpass the 2 Mach.
When the airplane approached the enemy bombers, it should come down to 10,000 m and reduce speed, opening the nozzle flaps -acting as airbrakes- to its maximum.

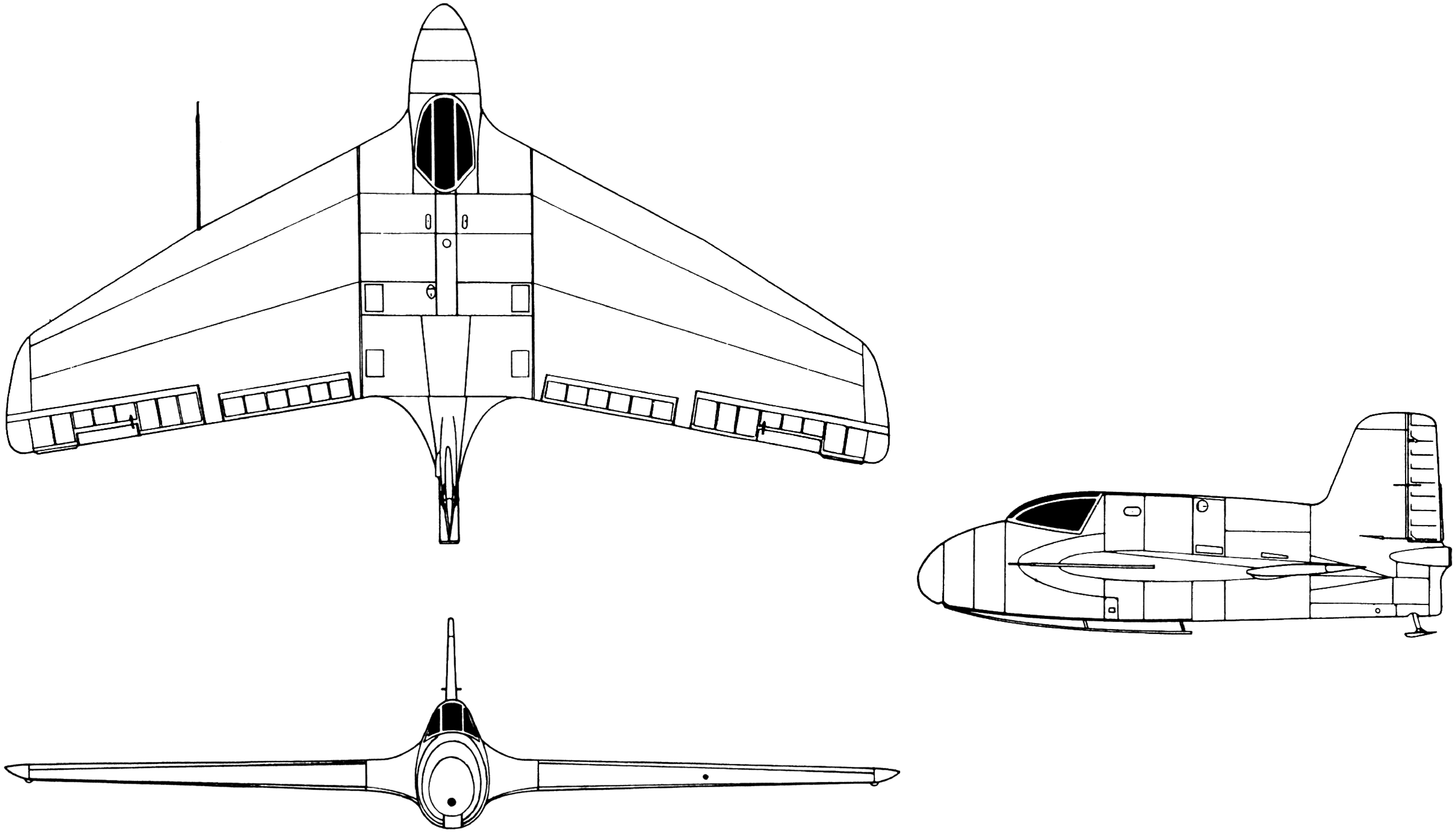
Although the power of the engine could be regulated by opening or closing the nozzle flaps, this could not be stopped at will by the pilot. As it happened with the Komet, the LP13 should patiently fly in a defensive circle, until all it fuel was exhausted, and glided down to land on its three retractable skids. After landing, the airplanes were fully exposed to the fighters until the arriving of the recovery vehicles, based on the "Scheuschlepper" of the Komet, which transported the airplanes to the base.

All these problems might have been counterbalanced by the fact that the airplane could not be intercepted even though its dog-fight capacity was almost null during powered flight.

TECHNICAL DATA

Type	Supersonic ramjet-powered interceptor
Wings	60 degrees sweep at the leading edge (15 degrees at the trailing edge) 12% thickness at root, delta planform with elevons. Metallic structure and cladding.
Tailfin	66 degrees sweep, 17.5% thickness at root housing the pressurised cockpit, the T-Stoff tanks and the Walter rocket.
Landing gear	Formed by a central skid and two more at the wing roots. All of them hydraulically retractable.
Engine	One solid fuel ramjet with more than 60,000 h.p. of power and a bi-fuel Walter HWK 109-509 S2 rocket with 1,993 kp of static thrust.
Fuel tanks	One of T-Stoff and 170 lt. in the tailfin and two more of C-Stoff and 155 lt. in the wings
Armament	Two MG 213/20 or MG 213/30 guns in the wings or 24 R4M "Orkan" rockets of 55 mm or two SG 500 "Jägerfaust" devices with 12 guns of 50 mm each

Measures	
Wingspan	6m
Length	6.7 m
Height	3.25 m
Wing area	20 m^2
Empty weight	1,800 kg.
Take-off weight	3,000 kg
Maximum speed	Mach 2
Service ceiling	30,000 m.
Range (max powered endurance)	45 min



1/72 scale

Me 163A

Messerschmitt Me 163 A

Research airplane based on the DFS 194 built by Messerschmitt to test the feasability of the "rocket fighter" formula by prof. Alexander Lippsich.

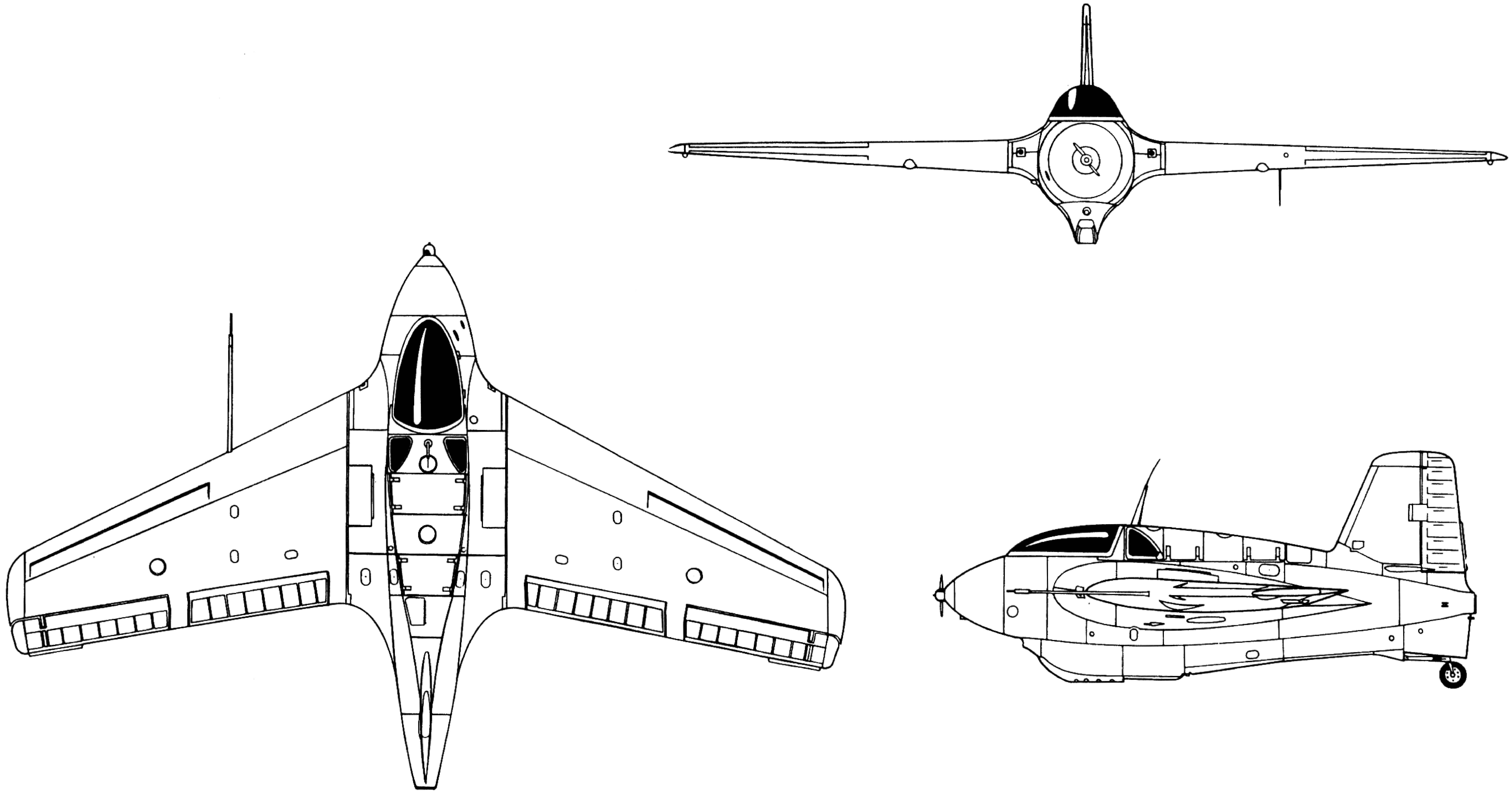
Six prototypes and ten preproduction airplanes of the Me 163 A-O series were built in Lechfeld and Göttingen between November 1940 and December 1941.

The HWK RII-203 engines were installed in the V1 and V4 prototypes for the flight tests performed between July and October 1941.
To the purpose of saving fuel, the airplanes were towed by a Bf 110 C up to 4,000 m.
During one of these tests, the Me 163 A V4 piloted by Heinrich Dittmar reached the speed of 1,000 km/h on 2 October 1941. Once the problems related with the difficult take off, with the dangerous detachable trolley, were overcome, it proved once again its exceptional flying characteristics.

The airplanes of the A-O series were used for the training of crews and mechanics, as well as for testing armament and equipment, to facilitate the entering into service of the operational Me 163 B version.

TECHNICAL DATA

Type	Experimental rocket fighter
Phase	Fligh tests
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Detachable trolley, retractable skid.
Engine	One bifuel Walter HWK RII 203 b rocket with 750 kp static thrust
Fuel tanks	T-Stoff and Z-Stoff in the fuselage
Armament	24 unguided R4M rockets under the wings for armament testing
Wingspan	8.85 m.
Length	5.60 m.
Height	2.16 m.
Wing area	17.5 m^2
Maximum weight	2,400 kg
Maximum speed	1,004 km/h



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Me163 B-1

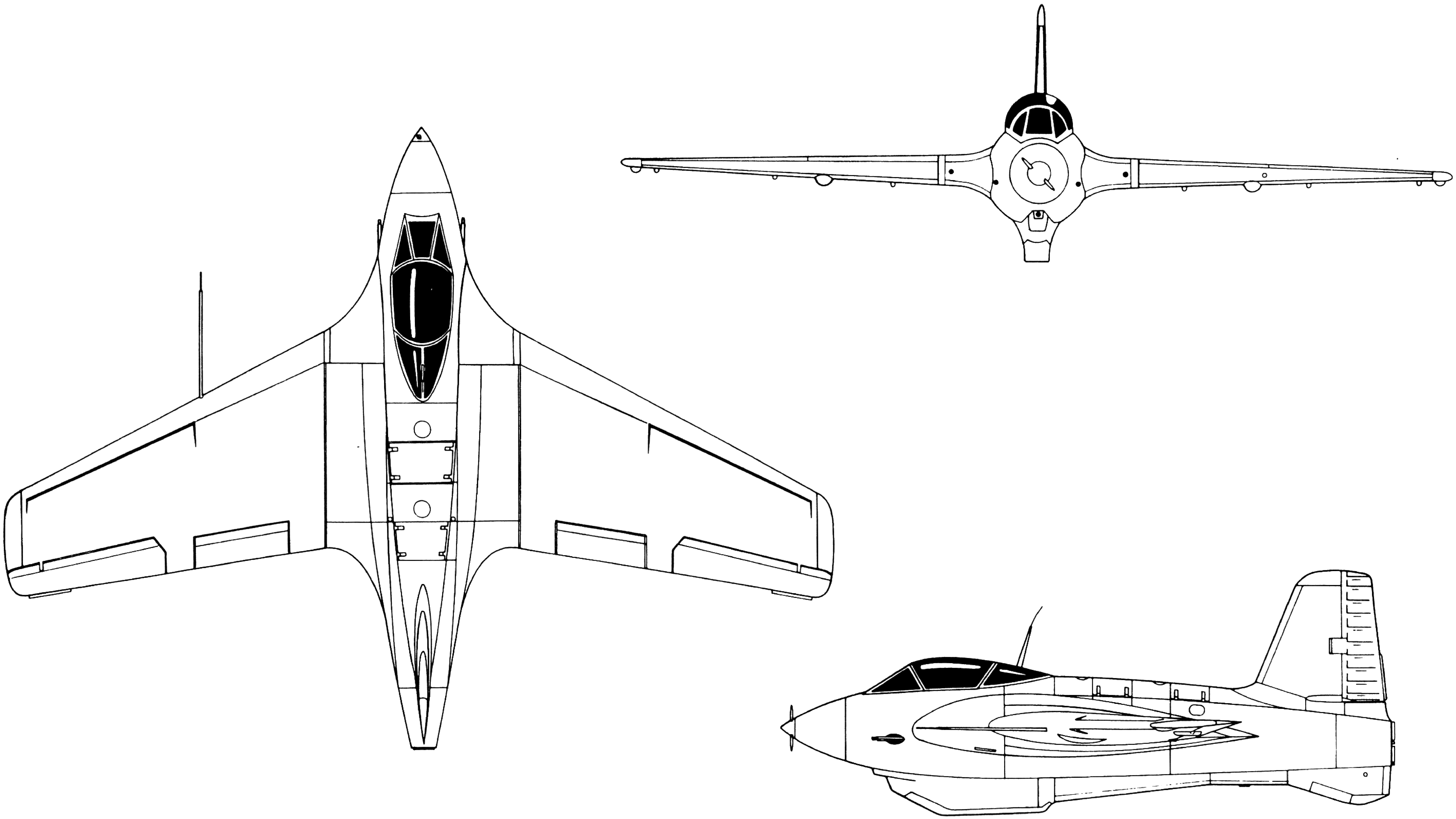
Messerschmitt Me 163 B-1

Operational version of the Me 163 A that went into service in May 1944 having the distintion of being the only rocket airplane used in combat.

There were 23 prototypes, 47 Me 163 B-O preproduction airplanes, 400 Me 163 B-1a series and 42 Me 163 S training airplanes built. However, just a small part was accepted by the Luftwaffe due to the numerours manufacturing faults, consequence of the decentralised production methods adopted by the end of the war.

TECHNICAL DATA

Type	Rocket fighter
Phase	Operational
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Detachable trolley, retractable skid.
Engine	One bifuel Walter HWK 109-509 A-1 rocket with 1,600 kp static thrust
Fuel tanks	Three of T-Stoff in the fuselage and four of C-Stoff in the wings
Armament	Two Mk 108/30 guns in the wing roots
Wingspan	9.3 m.
Length	5.92 m.
Height	2.76 m.
Wing area	19.6 m^2
Maximum weight	3,100 kg
Maximum speed	950 km/h
Ceiling	15,500 m.



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Me 163C

Messerschmitt Me 163 C

Improved version of the Me 163 B by which it was tried to amend some of the deficiencies found in that model that was prematurely used in combat.

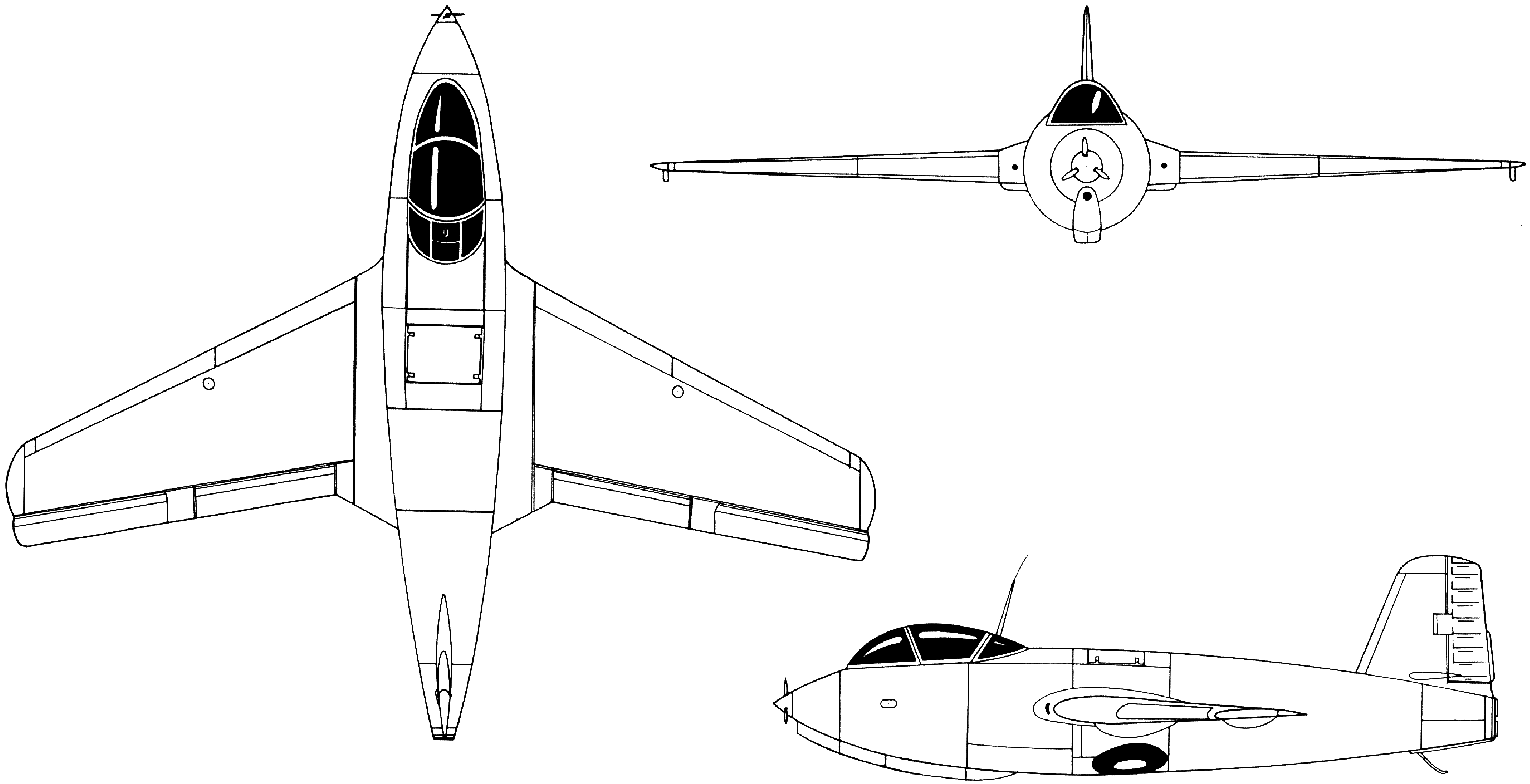
The new Komet used an engine with two combustion chambers for acceleration and cruise flight. The wings were the same ones than in the B version but it was added a new central section between them that increased both wingspan and area.

The fuel capacity was also increased by a bigger fuselage with tear drop cockpit. Two more guns were added to the forward area of the fuselage and the electronic equipment was improved.

The new engine was tested in flight with two prototypes of the B series, the V6 and V18, in July 1944. From the three prototypes of the C series (V1, V2 and V3), built before the end of the war, at least one of them reached the flight testing phase.

TECHNICAL DATA

Type	Rocket fighter
Phase	Flight tests
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Detachable trolley, retractable skid.
Engine	One bifuel Walter HWK 109-509 C rocket with 400 + 2000 kp static thrust
Fuel tanks	Two of T-Stoff in the fuselage and four of C-Stoff in the wings
Armament	Four Mk 108/30 guns
Wingspan	9.8 m
Length	7.04 m.
Height	2.89 m.
Wing area	20.5 m^2
Maximum weight	5,000 kg
Maximum speed	880 km/h
Ceiling	14,000 m.
Range	130 km.



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Me 263/Ju 248

Messerschmitt Me 263

Developed in parallel with the Me 163 C, it was superior to it and able to manoeuvre in ground over its tricycle landing gear, this making it independent from the Scheuschlepper towing vehicles.

It had a new engine with two combustion chambers, greater fuel capacity and improved armouring and electronics. A prototype (Me 163D V1) with a fixed landing gear was built and tested.

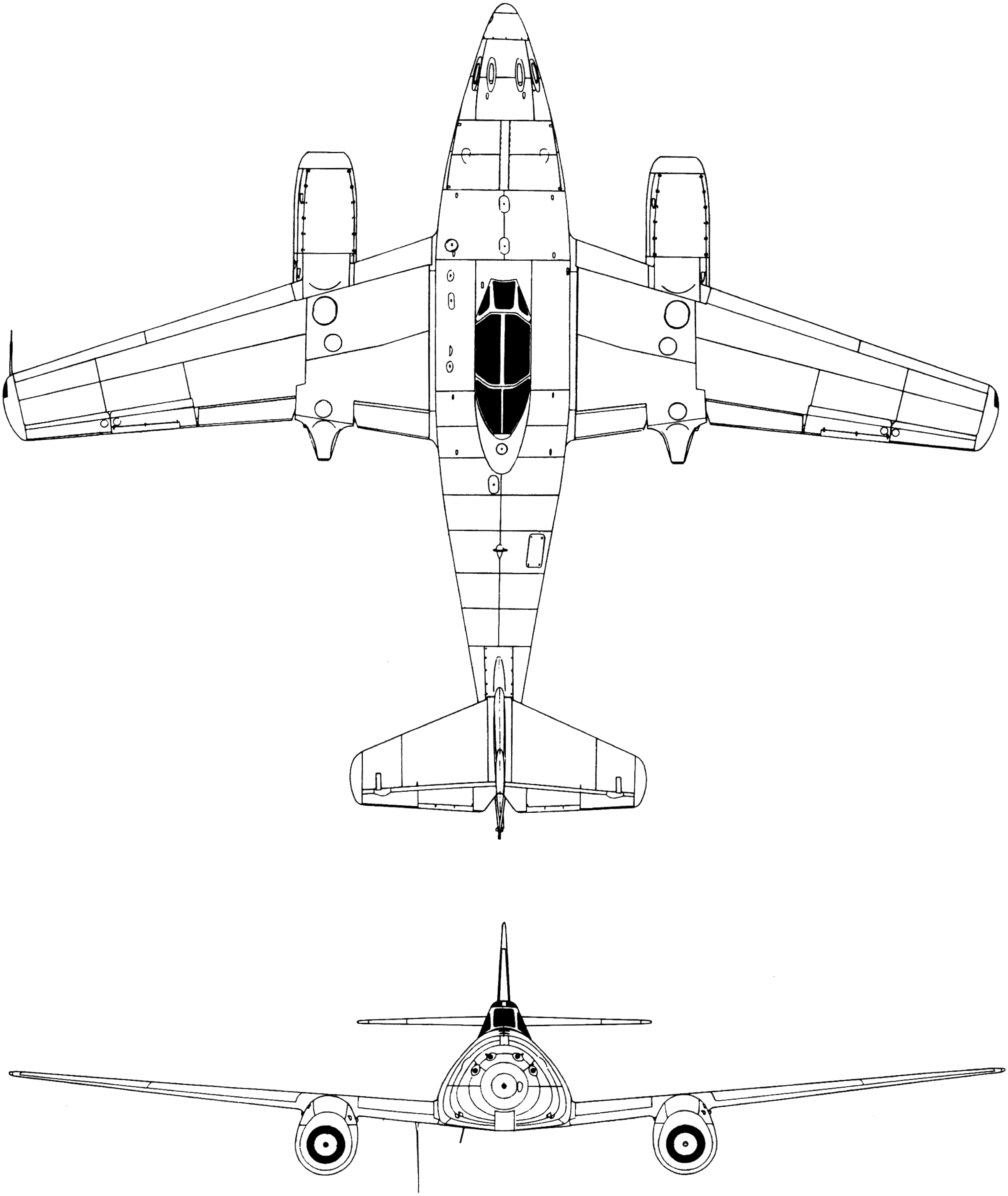
Afterwards the whole project was transferred to Junkers, as Ju 248, who made some changes in the wing slots, flaps and cockpit pressurisation, adopting a tear drop cockpit of new design.

The prototype Ju 248 V1 was finished in Dessau and flew towed by a Ju 188 in August 1944.

It was foreseen that the operational version (Me 263 A-1) would be equipped with the new more powerful and safer engine BMW 708.

TECHNICAL DATA

Type	Rocket fighter
Phase	Flight tests
Wings	Wooden structure and cladding
Fuselage	Metallic structure and cladding.
Landing gear	Tricycle type
Engine	One bifuel Walter 109-509 C-1 rocket with 400 + 2000 kp static thrust
Fuel tanks	Two of T-Stoff in the fuselage and four of C-Stoff in the wings
Armament	Two Mk 108/30 guns in the wing roots
Wingspan	9.5 m
Length	7.88 m.
Height	3.17 m.
Wing area	17.8 m^2
Maximum weight	5,113 kg
Maximum speed	880 km/h
Ceiling	14,000 m.



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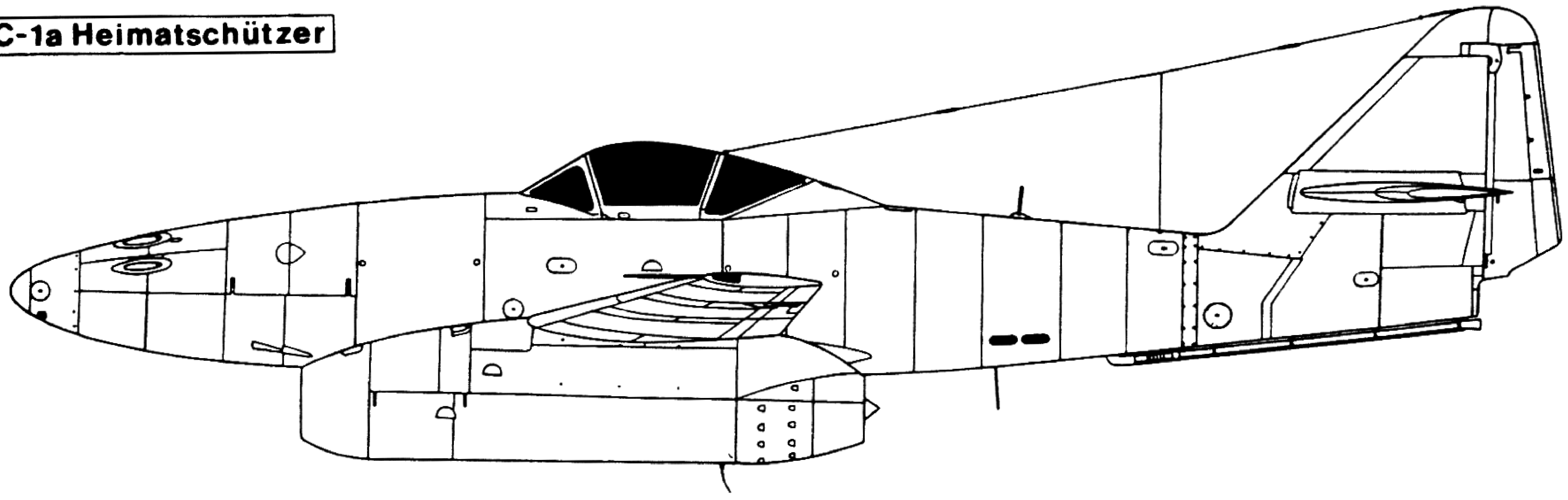
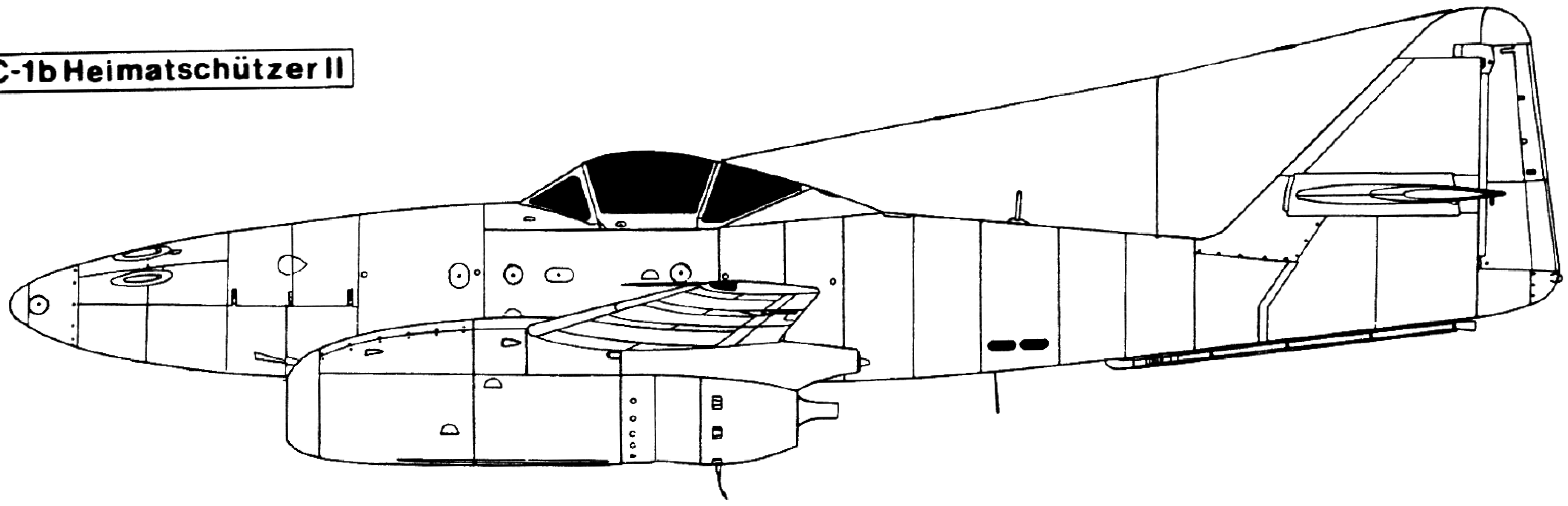
Me 262 C-1b Heimatschützer II

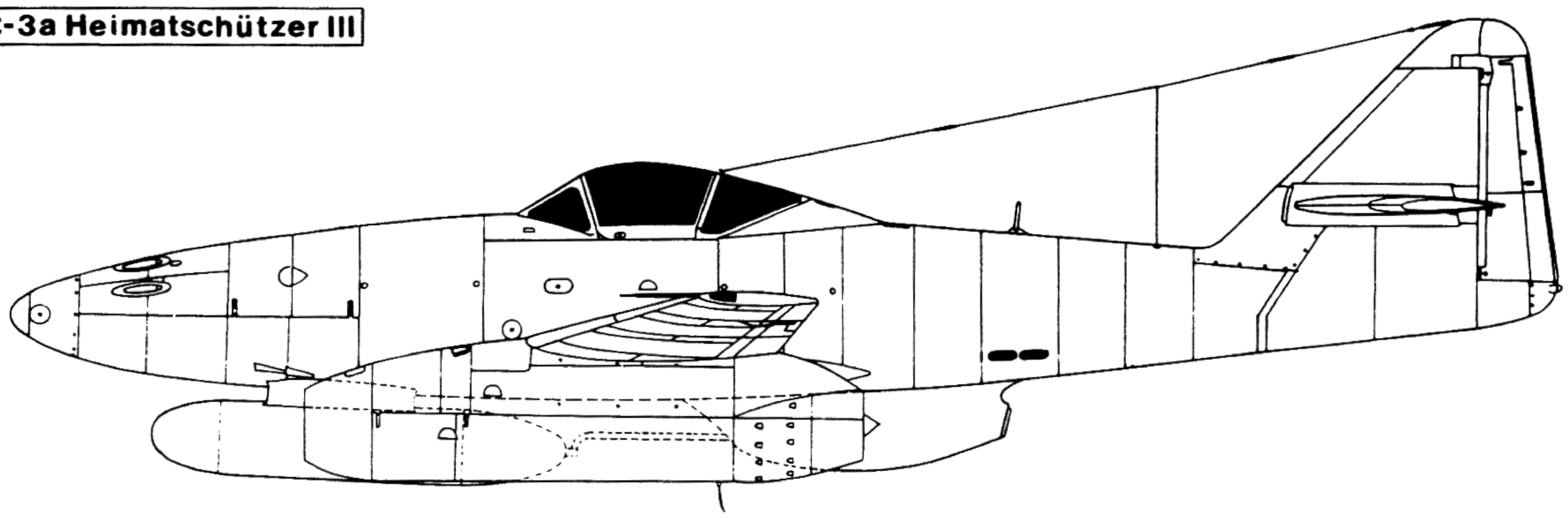
Me 262 C-1a Heimatschützer



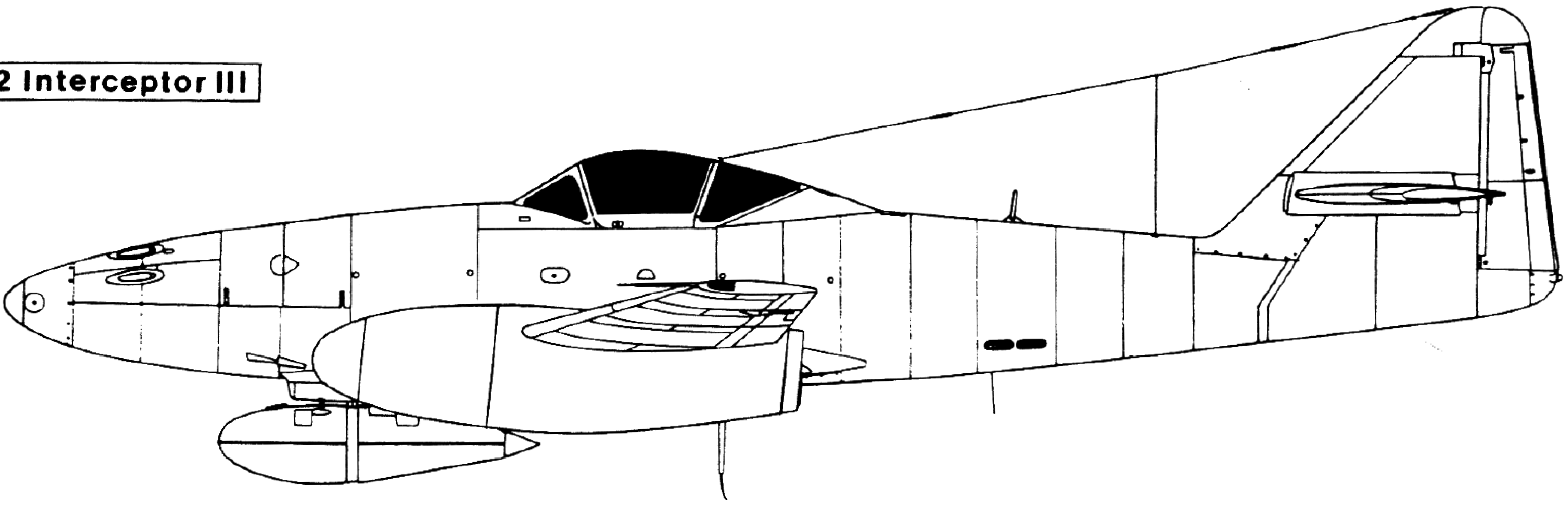
Me 262 C-1b Heimatschützer II



Me 262 C-3a Heimatschützer III



Me 262 Interceptor III



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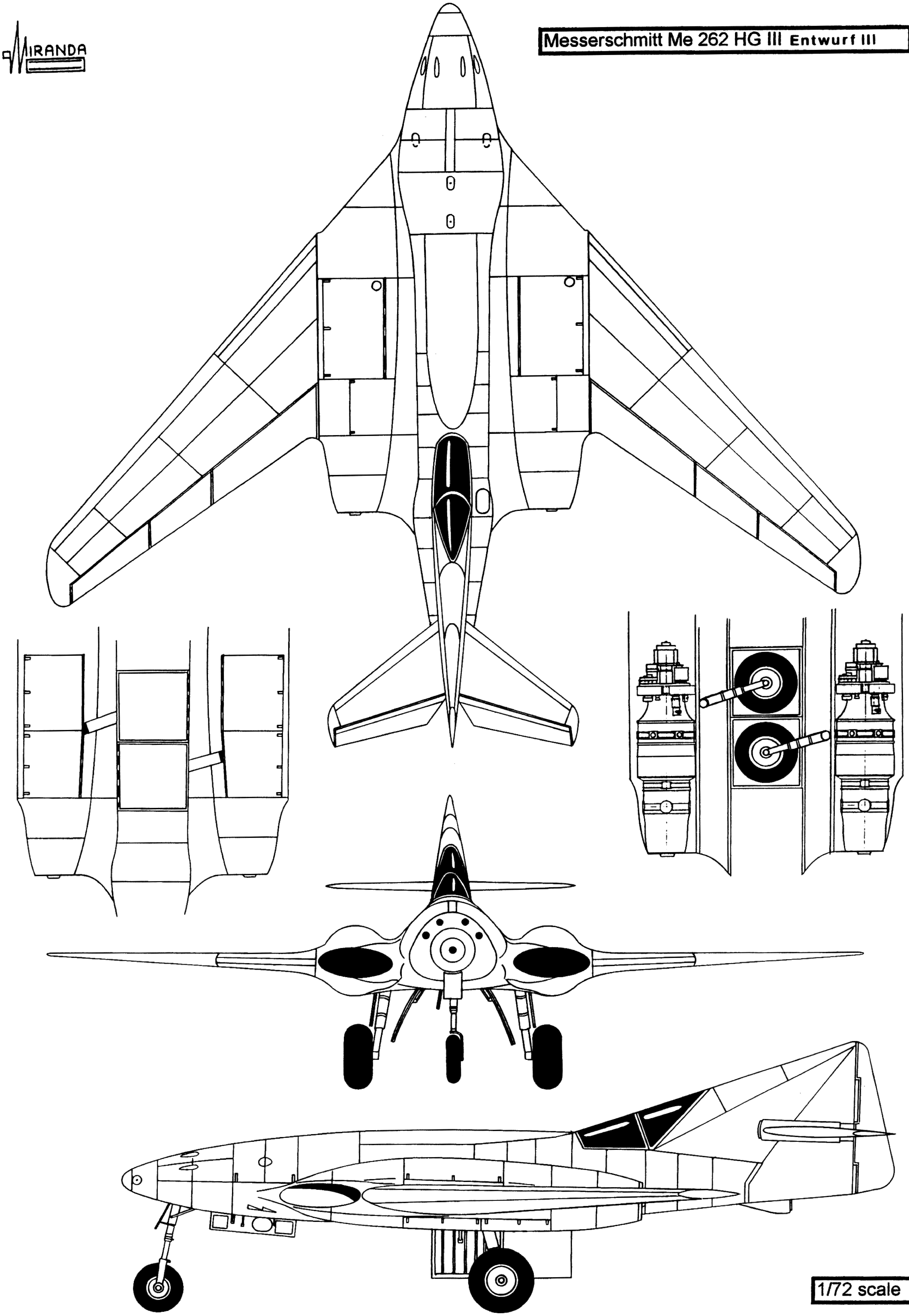
MIRANDA

Messerschmitt Me 262 HG III Entwurf III



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Messerschmitt Me 262 HGIII Entwurf III"

The two-engined fighters like the Me 210 and Me 262, designed before 1942, were not suitable for high altitude combat. Their great mass and the turbulence generated at high altitude between the lower face of the wing and the engine nacelles were the reasons.

During the test flights of the Me 262 C-1a Heimatschützer 1 (Home Protector) it turned out that the excess of power generated by the Walter 509 rocket should be counterbalanced by flying with the nose slightly upwards, thus avoiding that the airplane would reach the critical Mach number.
The designers then tried another solution, fitting the Me 262 with a more streamlined shape. This had the effect of delaying the appearance of the turbulence.

The program, started in February 1944, was named Hochgeschwindigkeit (HG). Through gradual developments, the sweeping of the wing and tail surfaces was increased up to 45° and the new HeS 011 engines, with a special cowling and oval air intakes in the leading edge, were installed within the wing.

The wind tunnel tests proved that this was the right solution and that the final version, named HG III Überschall-Turnbinenjäger, was a 1,000 km/h design with transonic capabilities for combat at high altitude without losing control

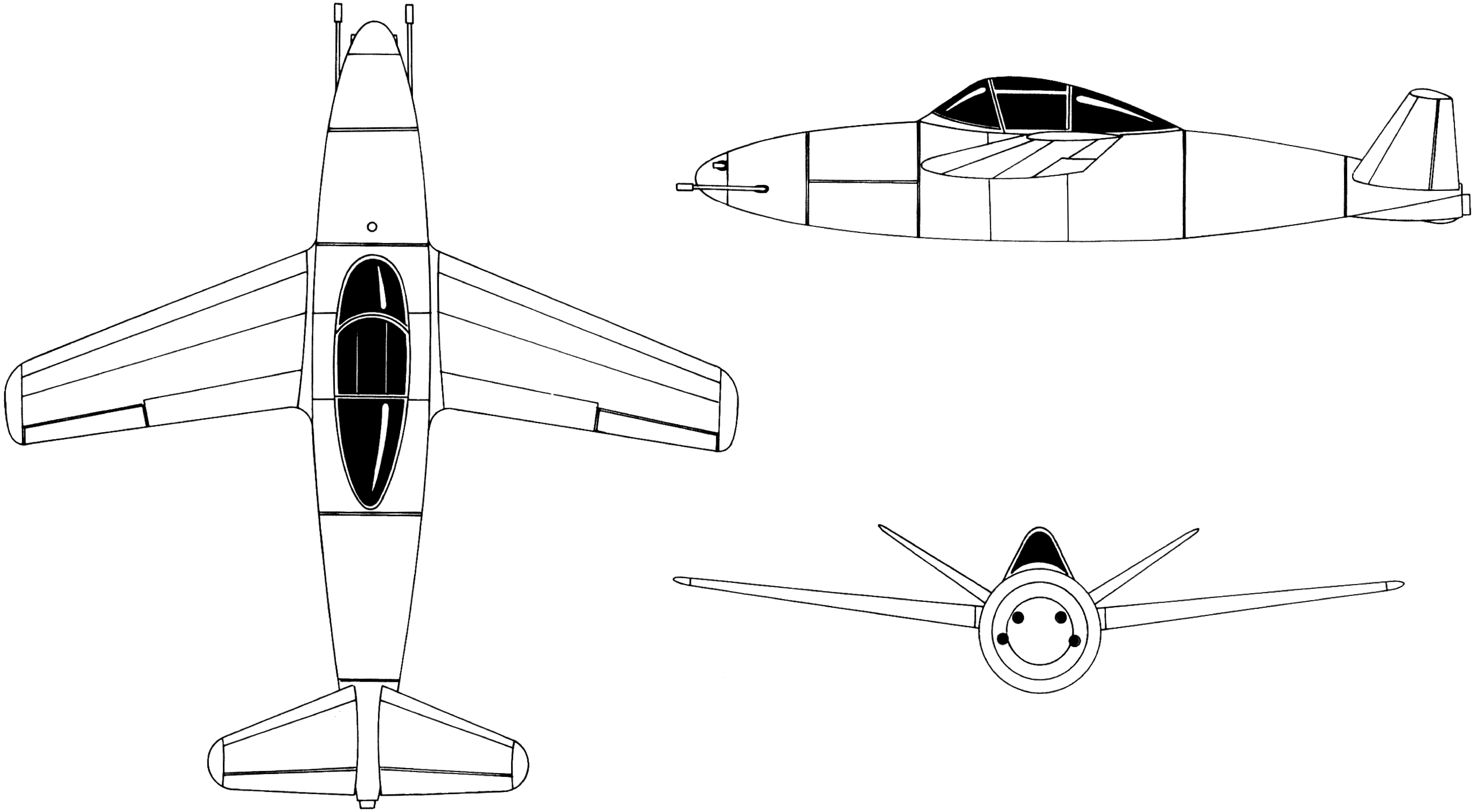
The plan was to build a new Nachtjäger version and use the HG III for testing any aerodynamic novelty applied to the most advanced designs of the Jäger-Notprogramm P.1006 and P.1110.
A variant fitted with a butterfly tail was expected to be faster than the one with conventional tail surfaces. Another housed the pilot in the tailfin to avoid the overlapping of the shock waves generated by the conventional cockpit and the wing. This version should serve to test the new type of cockpit at transonic speed before being installed in the P.1006 fighter series.

The Walter 109-509 S2 compact rocket with 1,993 kp of thrust, originally designed as climb boost for the Me 263 C-3, was to be used to this purpose.

TECHNICAL DATA

Type	Transonic interceptor
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding
Landing gear	Tricycle type
Engines	Two HeS 011 turbojet of 1,300 kp static thrust and a bi-fuel Walter 109-509 S2 rocket of 1,993 kp static thrust
Fuel tanks	In the fuselage
Armament	Four MK 108
Wingspan	11.45 m
Length	10.87 m.
Height	4.1 m.
Maximum speed	Transonic

Me P1092 B



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MIRANDA

Messerschmitt P.1092 B

The P.1092 was a research program started by the firm in 1943 to build a single seat single engined jet fighter able to replace the Bf 109

The scarce power developed by the turbojets of the time forced the designers to switch their attention towards the twin engined designs.

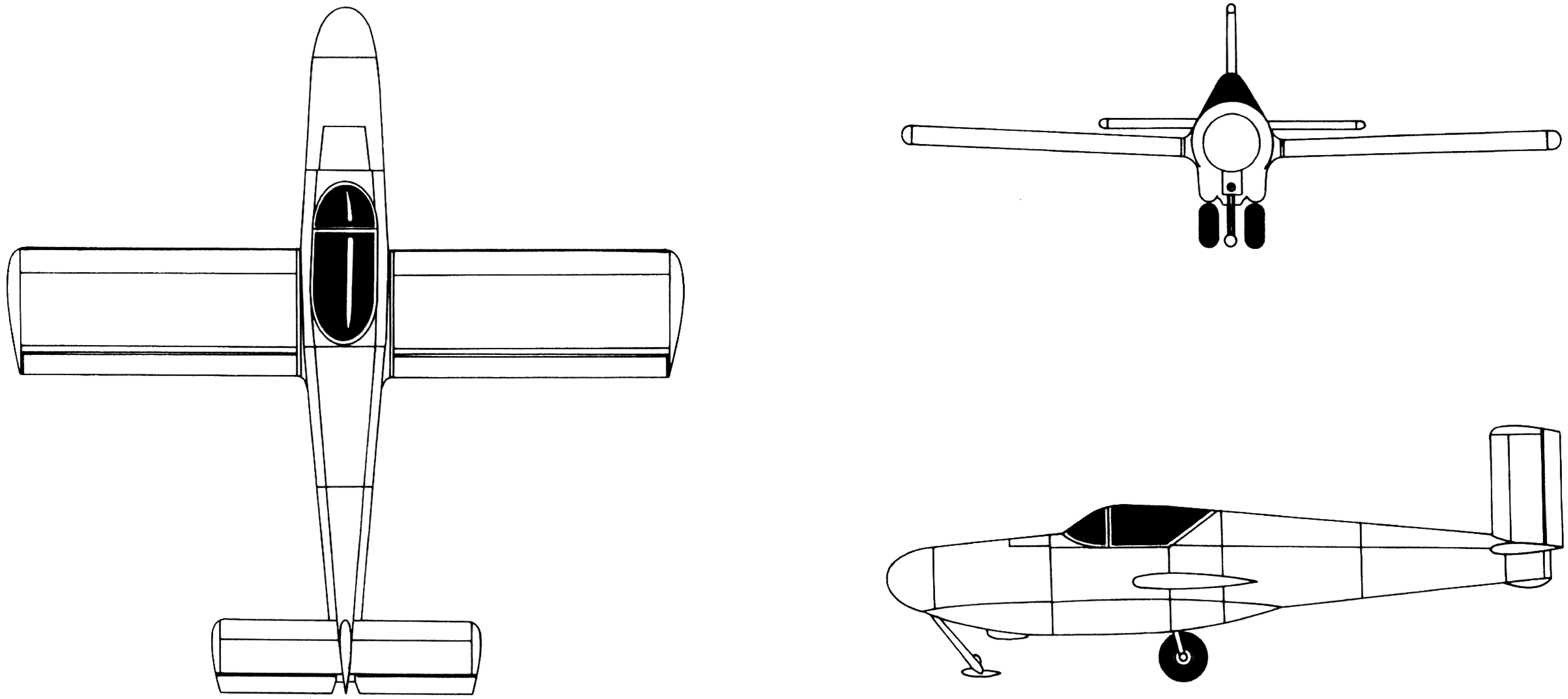
On 25 May 1943 the firm presented a variant of the P.1092 powered by a Walter rocket. It was an airplane fitted with a tricycle landing gear, heavy armament and big fuel capacity.

It was better than the Me 163 in many aspects, including the tear drop cockpit that allowed great visibility in combat.

However, its production was left aside in favour of the Komet.

TECHNICAL DATA

Type	Rocket fighter
Phase	Design
Wings	Wooden structure and cladding, 22° swept
Fuselage	Metallic structure and cladding, butterfly tail
Landing gear	Tricycle type
Engine	One bifuel Walter HWK 109-509 A-1 rocket with 1,600 kp. static thrust
Fuel tanks	Three of T-Stoff and three of C-Stoff in the fuselage
Armament	Two Mk 103/30 and two Mk 108/30 guns in the nose
Wingspan	8.7 m.
Length	9 m.
Height	2.5 m.
Wing area	12 m^2



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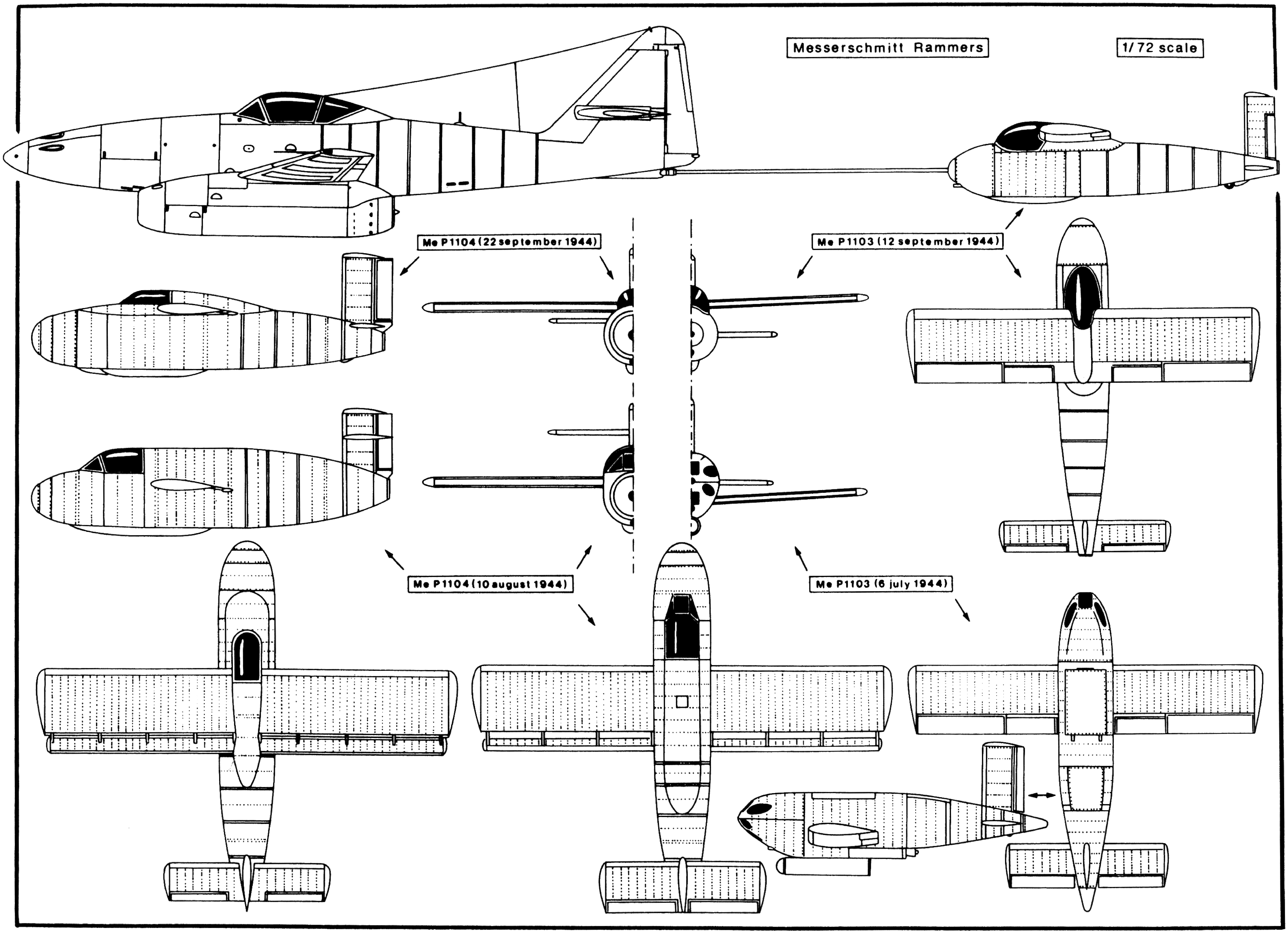
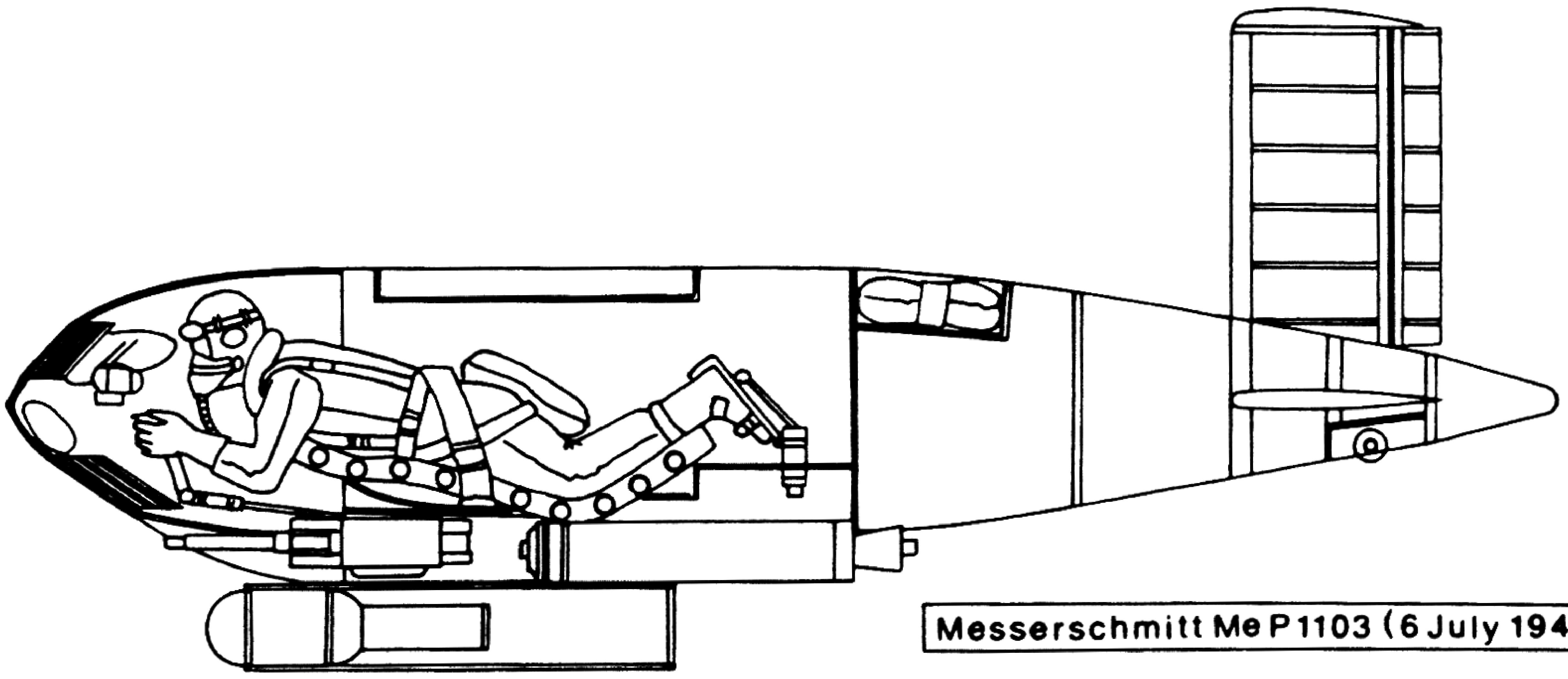
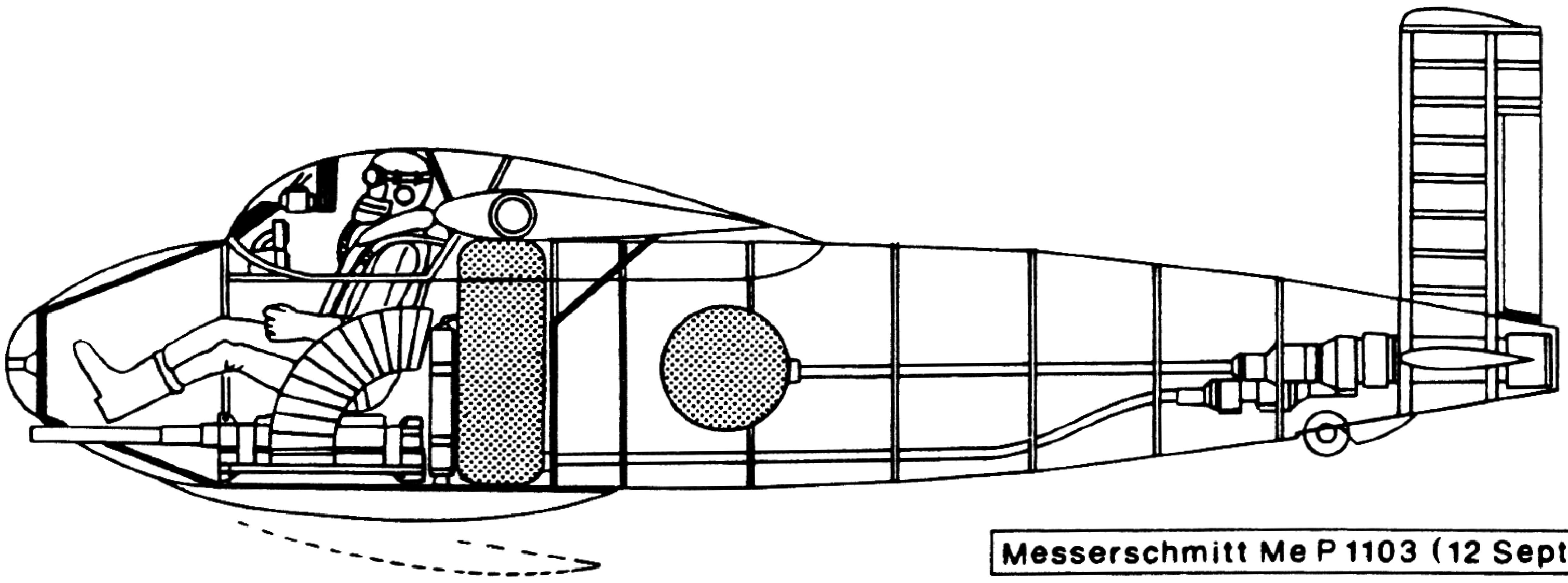
Me P1103B


Messerschmitt Rammers
1/72 scale
Me P1104 (22 september 1944)
Me P1103 (12 september 1944)
Me P1104 (10 august 1944)
Me P1103 (6 july 1944)

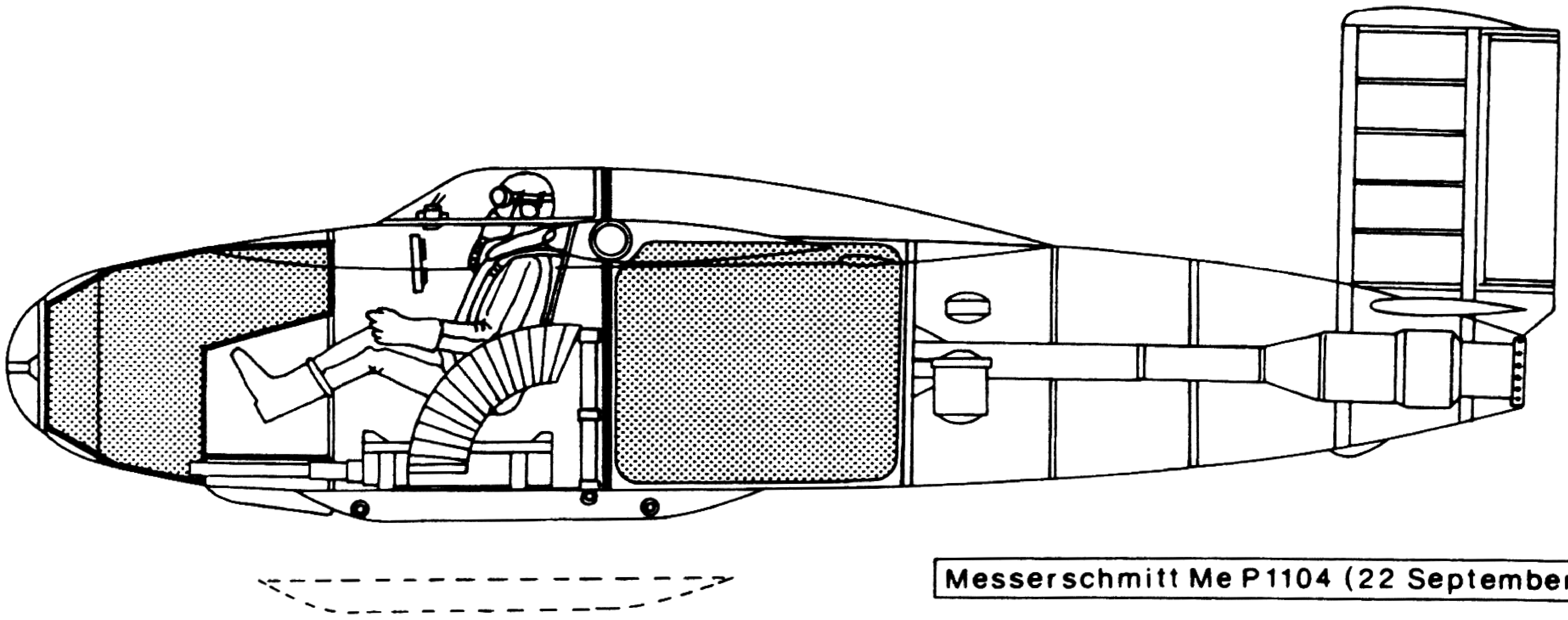
1/36 scale



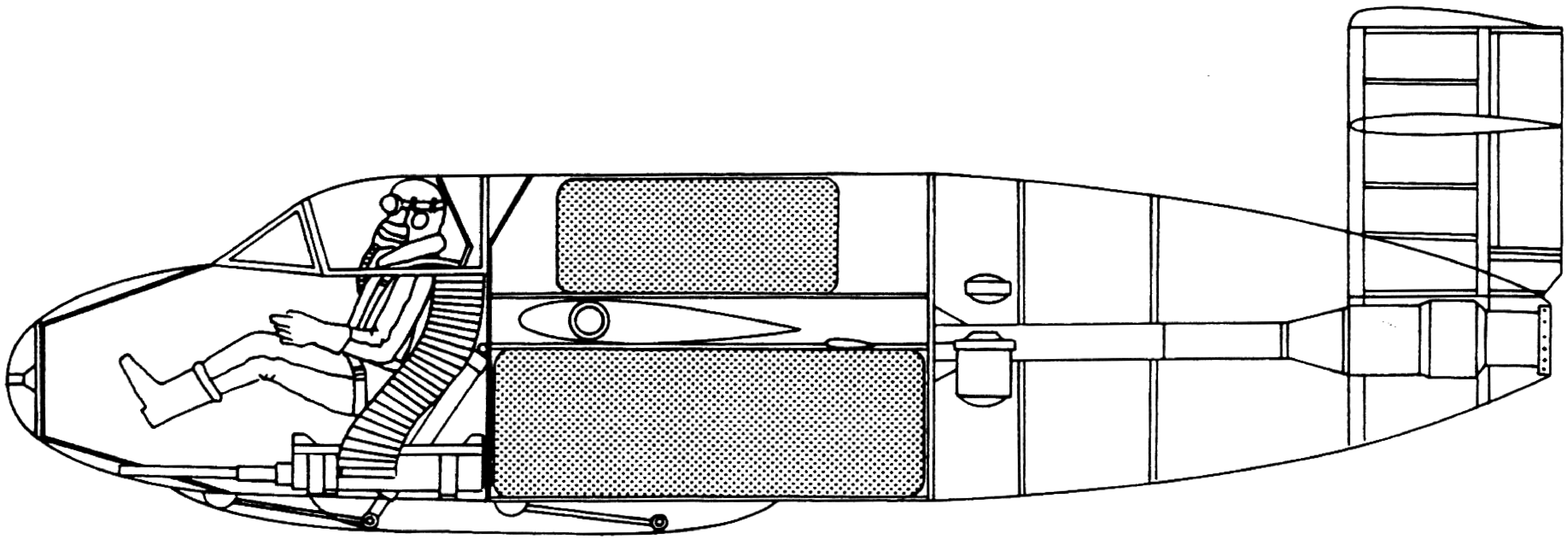
Messerschmitt Me P1103 (6 July 1944)



Messerschmitt Me P1103 (12 September 1944)



Messerschmitt Me P1104 (22 September 1944)



Messerschmitt Me P1104 (10 August 1944)

MESSERSCHMITT P1103/P1104

In 1944, the company designed two small rocket fighters to be towed to the combat area by a Bf 109G or a Me 262, using guns, rockets and collision tactics.
The first version of the P1103 was propelled by an Schmidding accelerator rocket using soid fuel. The pilot flew in a prone position and the airplanes was armed with an Mk 108 gun and a 21 cm Nebelwerfer rocket.
For the second version, the pilot was in a conventional position, the armament was reduced to just a gun and the engine was a Walter HWK 109-509 A-1.

TECHNICAL DATA

Wings	Steel tube structure with steel plate coating			
Fuselage	Steel plate and armoured windshields			
Landing gear	Retractable skid			
Engine	A Schmidding 109-513 of 100 kp (P1103/1)			
	A Walter RI202 (109-502) of 500 kp (P1103/2)			
	A Walter HWK (109-509 A-1) of 1,600 kp (P1104)			
	A Walter HWK (109-509 A-2) of 1,700 kp (P1103 B)			
Wingspan	P1103/1:	6.2 m	P1103/2:	5.38 m
	P1104:	6.2 m	P1103B:	4.40 m
Length	P1103/1:	4.7 m	P1103/2:	5 m
	P1104:	5.47 m	P1103B:	5.90 m
Height	P1103/1:	2.08 m	P1103/2:	1.73 m
	P1104:	2.16 m	P1103B:	1.80 m
Weight (loaded)	P1103/1:	1,200 kg	P1103/2:	1,110 kg
	P1104:	2,540 kg		
Maximum speed	P1103/1:	810 km/h	P1103/2:	700 km/h
	P1104:	800 km/h		

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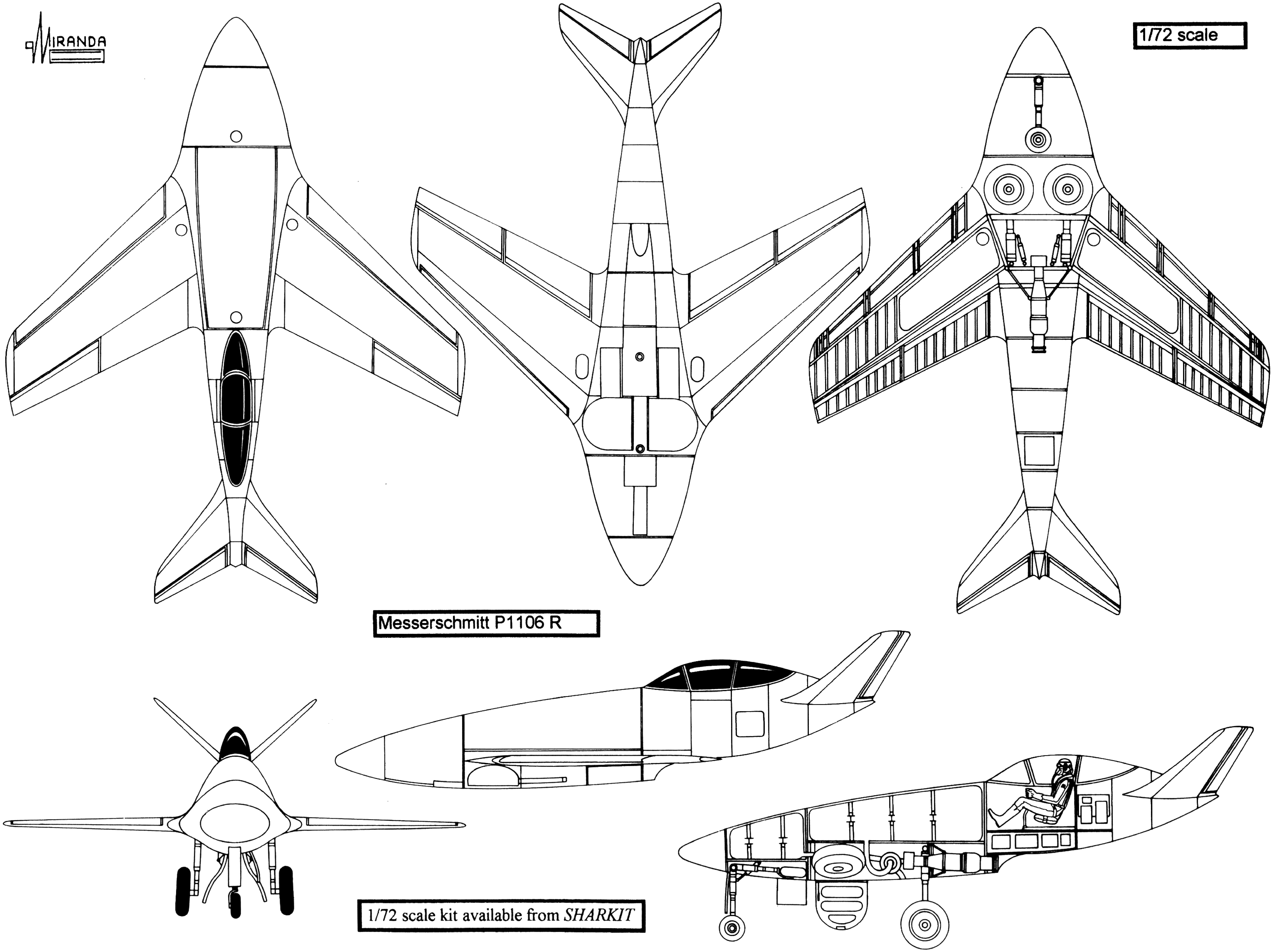


Messerschmitt P1106 R

1/72 scale kit available from *SHARKIT*

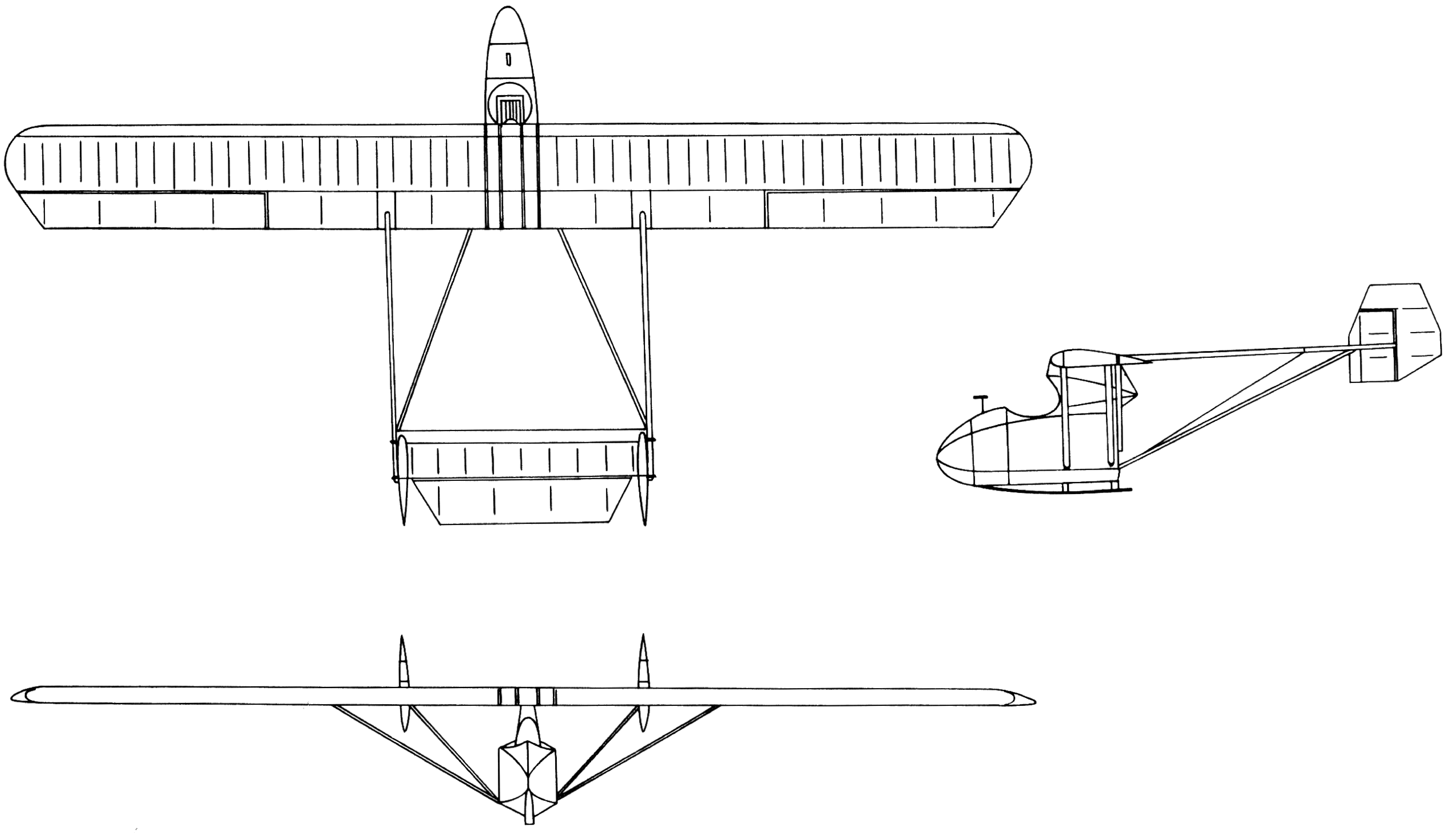
MESSERSCHMITT P.1106 R

During the design phase of the Messerschmitt P.1106 the technicians found so many aerodynamical problems with the transonic flow that it was seriously considered to build a version of the P.1106 with transonic capabilities to enter the test flight phase.
The airplane, named P.1106 R (14 December 1944) was to be powered by the compact version of the Walter 509 rocket known as "S2", originally developed for the Me 262 C-3. It carried enough fuel to function during 12 minutes

Although the production version of the P.1106 had a wooden wing, it is quite possible that both the one on the P.1106 R and the DM-2 one were made out from metal, due to the presence of the T-Stoff.
This terrible fluid made burnt any organic material that were in touch with it and the operational experience with the Komet, with its wooden wings, advised the use of metal in future designs.

TECHNICAL DATA

Type	Research rocket plane
Wings	40 degrees sweep, 12 to 8% thickness, metallic structure and cladding.
Tail surface	In "V" with 90° openness. Metallic structure and cladding
Fuselage	Oval section. Metallic structure and cladding. Pressurised cockpit.
Landing gear	Tricycle type. The main wheels were horizontally housed in front of the rocket in the fuselage and the forward wheel under the C-Stoff tank of the nose after rotating 90°
Engine	A bifuel Walter 109-509 S2 rocket with 1,993 kg of static thrust
Fuel tanks	One of T-Stoff and 1,300 lt. in the central area of the fuselage, one of C-Stoff and 360 lt. in the nose and two of C-Stoff and 180 lt. in the wings
Measures	
Wingspan	6.74 m
Length	8.42 m
Height	3.05 m
Wing area	13 m^2
Empty weight	1,700 kg.
Take-off weight	4,000 kg
Maximum speed	Mach 1 in shallow dive
Service ceiling	20,000 m.
Range	Powered endurance 12 min



Opel-Sander/Hatry Rak.1

1/72 scale

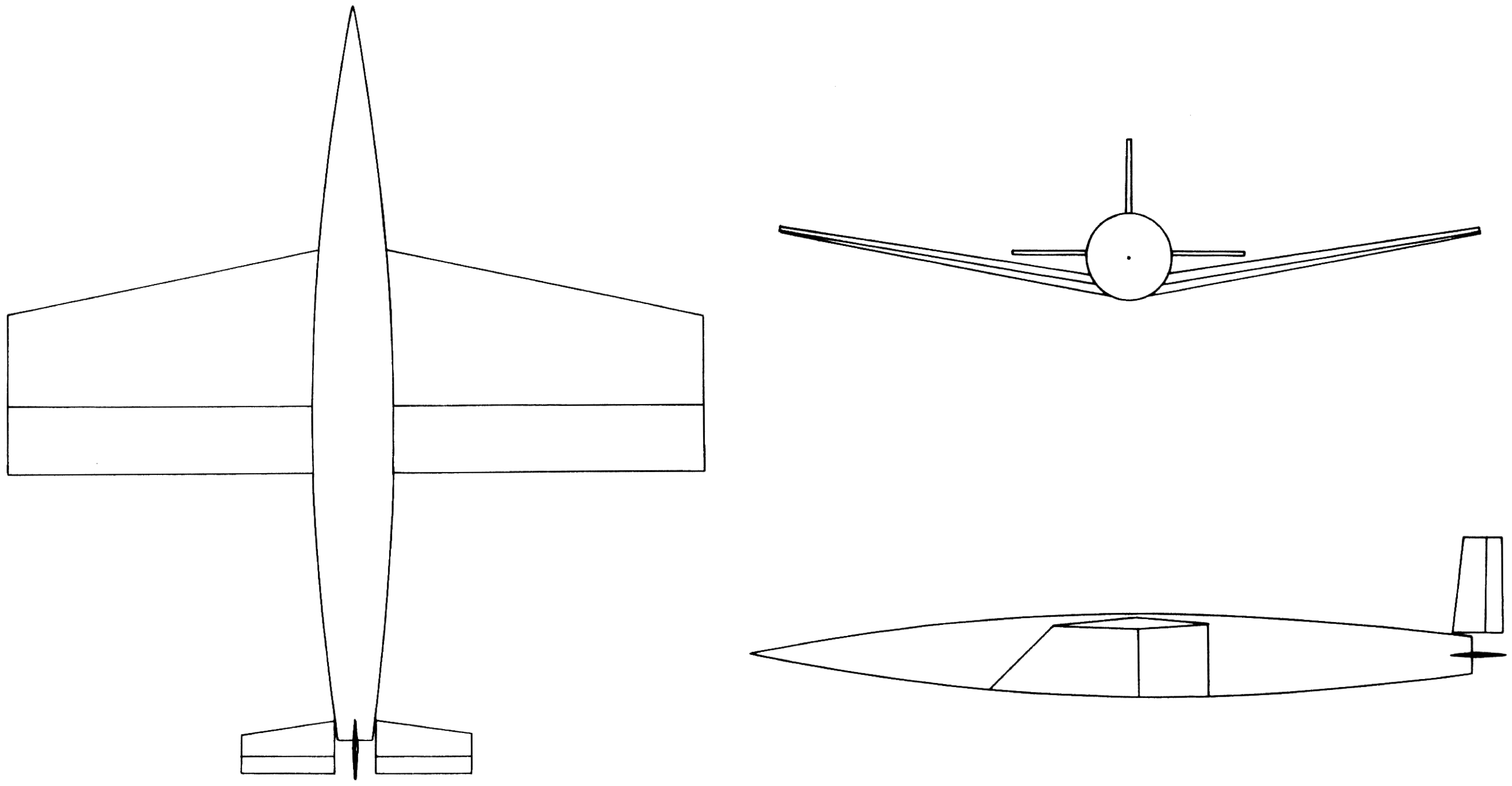
Opel-Sander/Hatry Rak.1

It was the second airplane to fly propelled by rockets. Piloted by Fritz von Opel, it took off on 30 September 1929 from Frankfurt-Rebstock using 16 Sander rockets with 25 kg thrust each that burnt in sequence in groups of four.

The airplane was destroyed in a later flight.

TECHNICAL DATA

Type	Experimental rocket glider
Phase	Flying test
Wings	Wooden structure and fabric cladding
Fuselage	Wooden structure and cladding.
Landing gear	One fixed skid
Engine	16 Sander rockets with 25 kp thrust each
Wingspan	11m
Length	5.5 m.
Height	1.9 m.
Wing area	11 m^2
Maximum speed	150 km/h
Range	1,500 m



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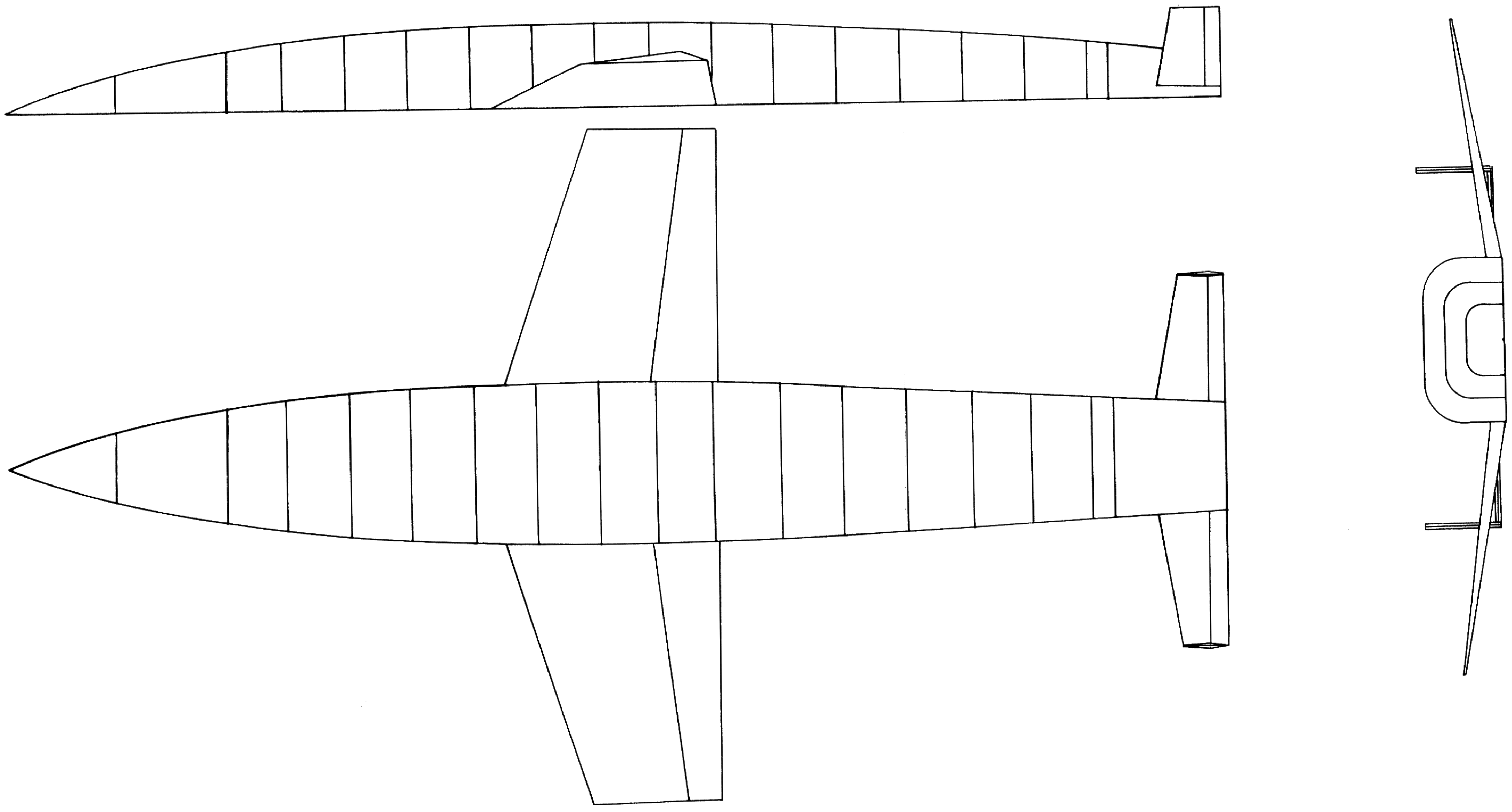
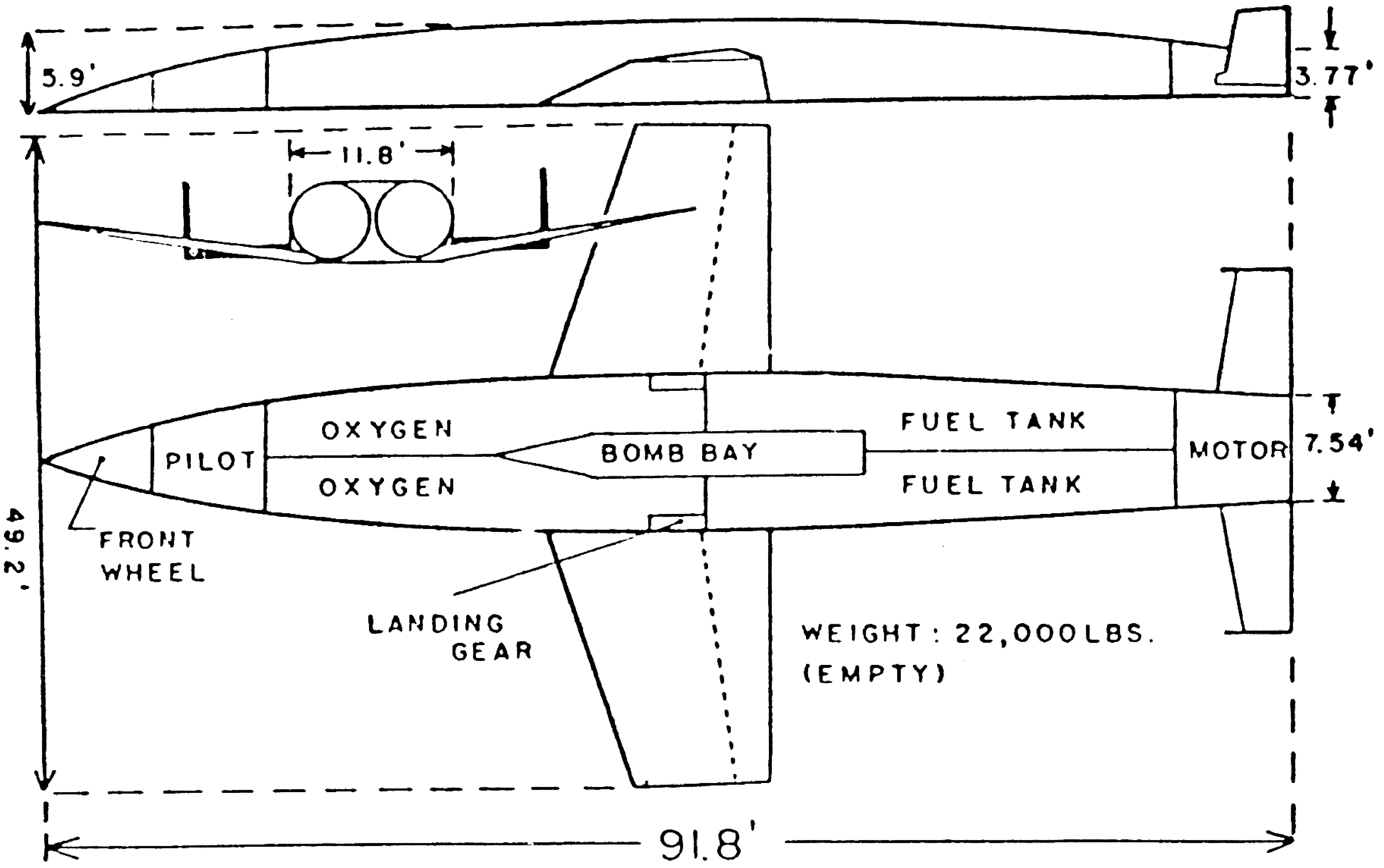
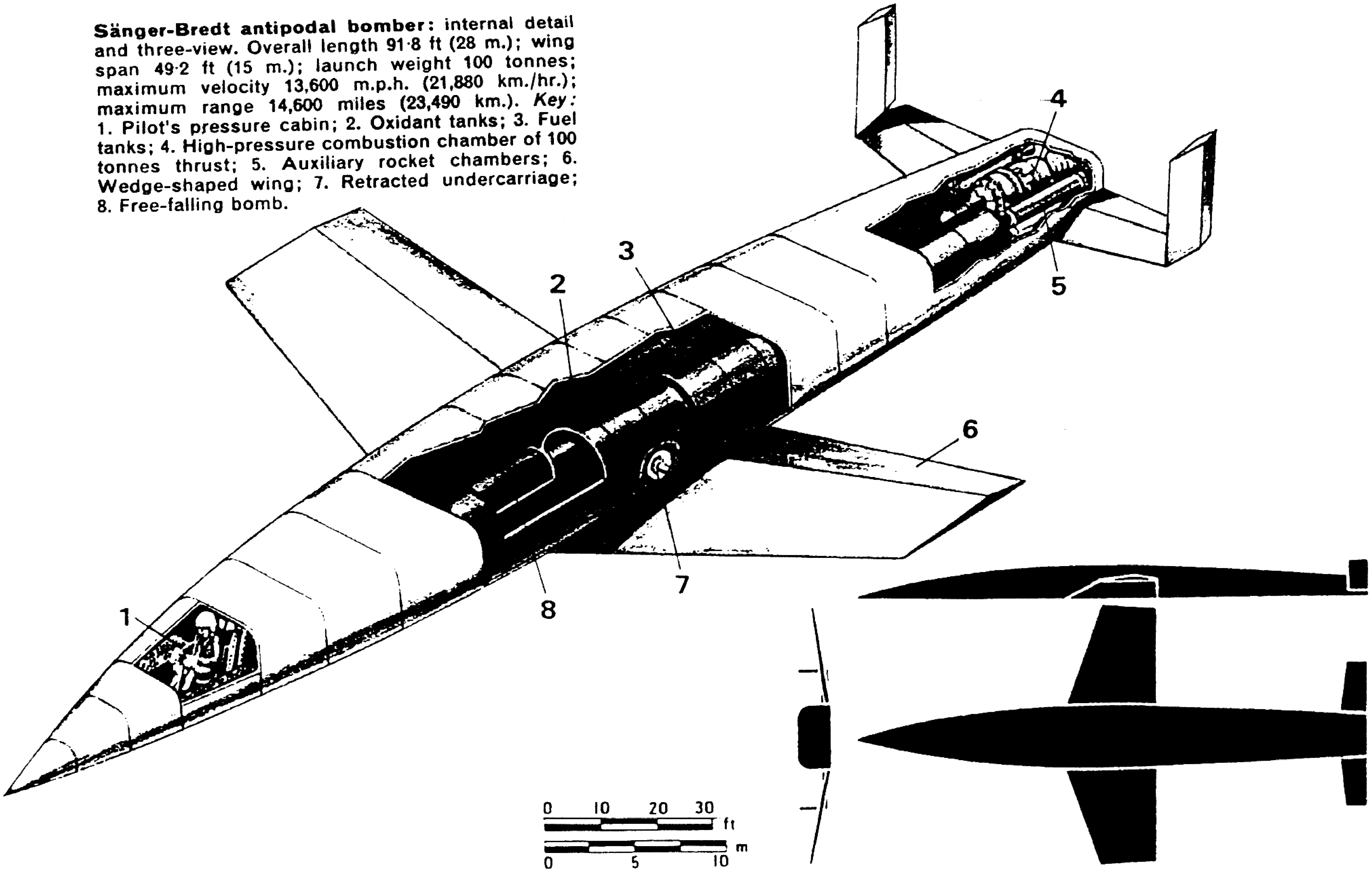
Sänger Rocket Plane 1931



Sänger Bredt Rocket Bomber 1943

1/144 scale





Sänger-Bredt antipodal bomber: internal detail and three-view. Overall length 91·8 ft (28 m.); wing span 49·2 ft (15 m.); launch weight 100 tonnes; maximum velocity 13,600 m.p.h. (21,880 km./hr.); maximum range 14,600 miles (23,490 km.). *Key:* 1. Pilot's pressure cabin; 2. Oxidant tanks; 3. Fuel tanks; 4. High-pressure combustion chamber of 100 tonnes thrust; 5. Auxiliary rocket chambers; 6. Wedge-shaped wing; 7. Retracted undercarriage; 8. Free-falling bomb.

Sänger Rocket Plane 1933

Project described in the essay "On construction and performance of rocket-planes" published in February 1933 by Dr. Eugen Sänger.

It was an airplane of a relatively conventional shape. The profile of the wings had to be as thin as possible, with sharp leading edges.
The aspect ratio can therefore be kept low because of the negligible resistance of the wingtips.
It would have been powered by a bi-fuel rocket Sänger that worked on petrol and LOX
The expectations were that it would reach a speed of Mach 10 and a height superior to 10,000 m.

This project was redefined in October 1938 giving way to the "Antipodal Bomber " in 1943

Sänger-Bredt Rocket Bomber 1943

Dr. Sänger designed an hypersonic glider between 1938 and 1942 that was powered by rockets and able to go all around the world. He extended its range following the method of bouncing it off the upper layer of atmosphere as a stone impacting water in a flat trajectory.

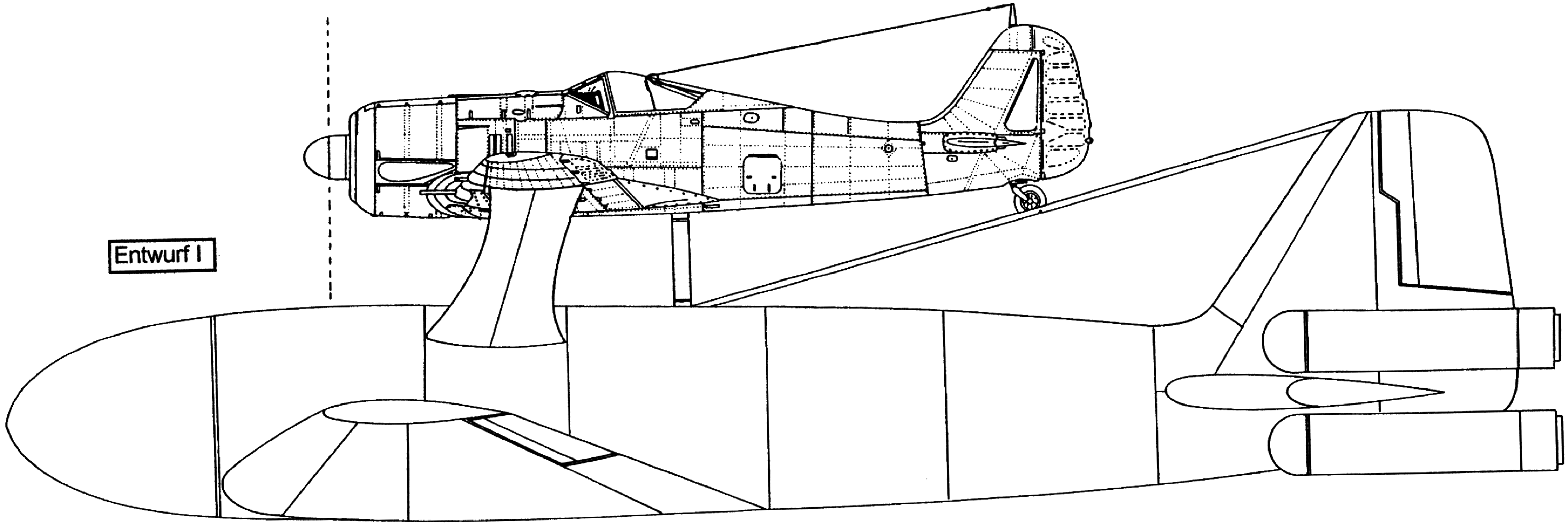
He proposed its manufacture to the German government as a machine able to bomb countries on the other side of the planet and its designation as "Antipodal Bomber".

The takeoff was over a 3,000 m long railway helped by solid fuel boosters of 600 tons thrust.
The main engine worked with 90 tons of petrol and liquid oxygen and could be reburnt in flight to again reach a higher altitude after each bouncing in the atmosphere. The total working time was 11 minutes.

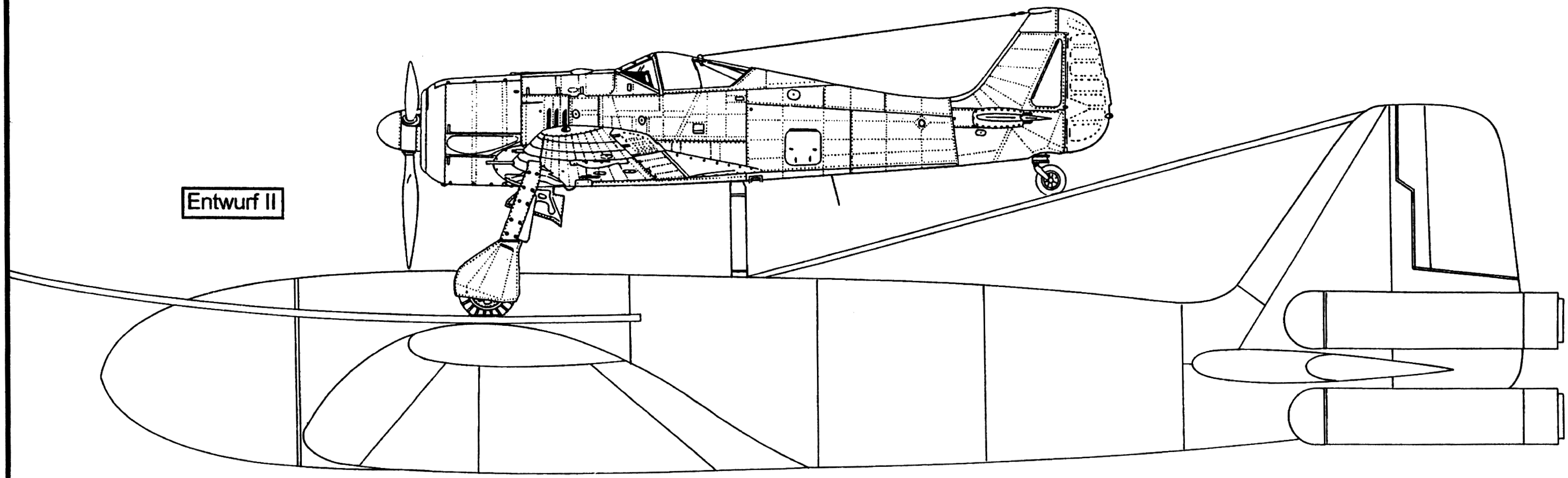
The construction of the "Antipodal Bomber" was left aside in favour of the intercontinental ballistic missile EMW A9/A10

TECHNICAL DATA

Type	Intercontinental rocket bomber
Phase	Windtunnel model
Wings	Metallic structure and cladding.
Fuselage	Metallic structure and cladding, pressurised cockpit
Landing gear	Tricycle type
Engine	A bi-fuel rocket Sänger of 100t thrust
Fuel tanks	Two of liquid oxygen and two of petrol in the fuselage with a total weight of 90 tons
Armament	300 kg of bombs
Measures	
Wingspan	15 m
Length	28 m
Height	1.8 m
Wing area	44 m^2
Maximum weight	100 tons.
Maximum speed	Mach 18
Ceiling	145 km.
Range	23,500 km



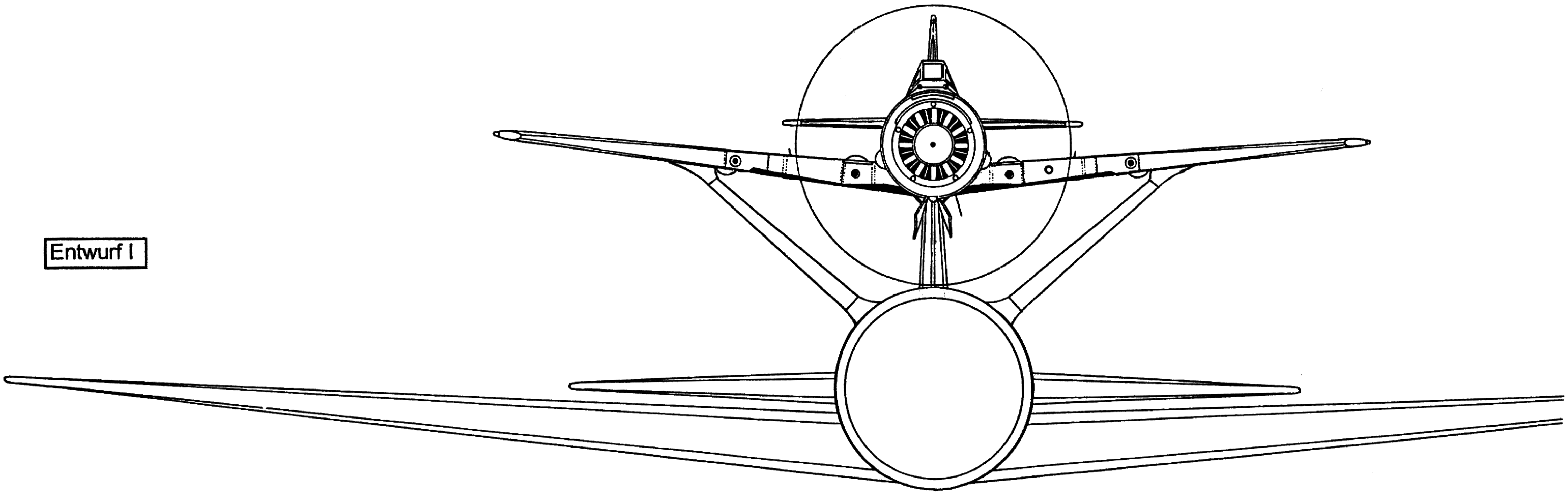
Entwurf I



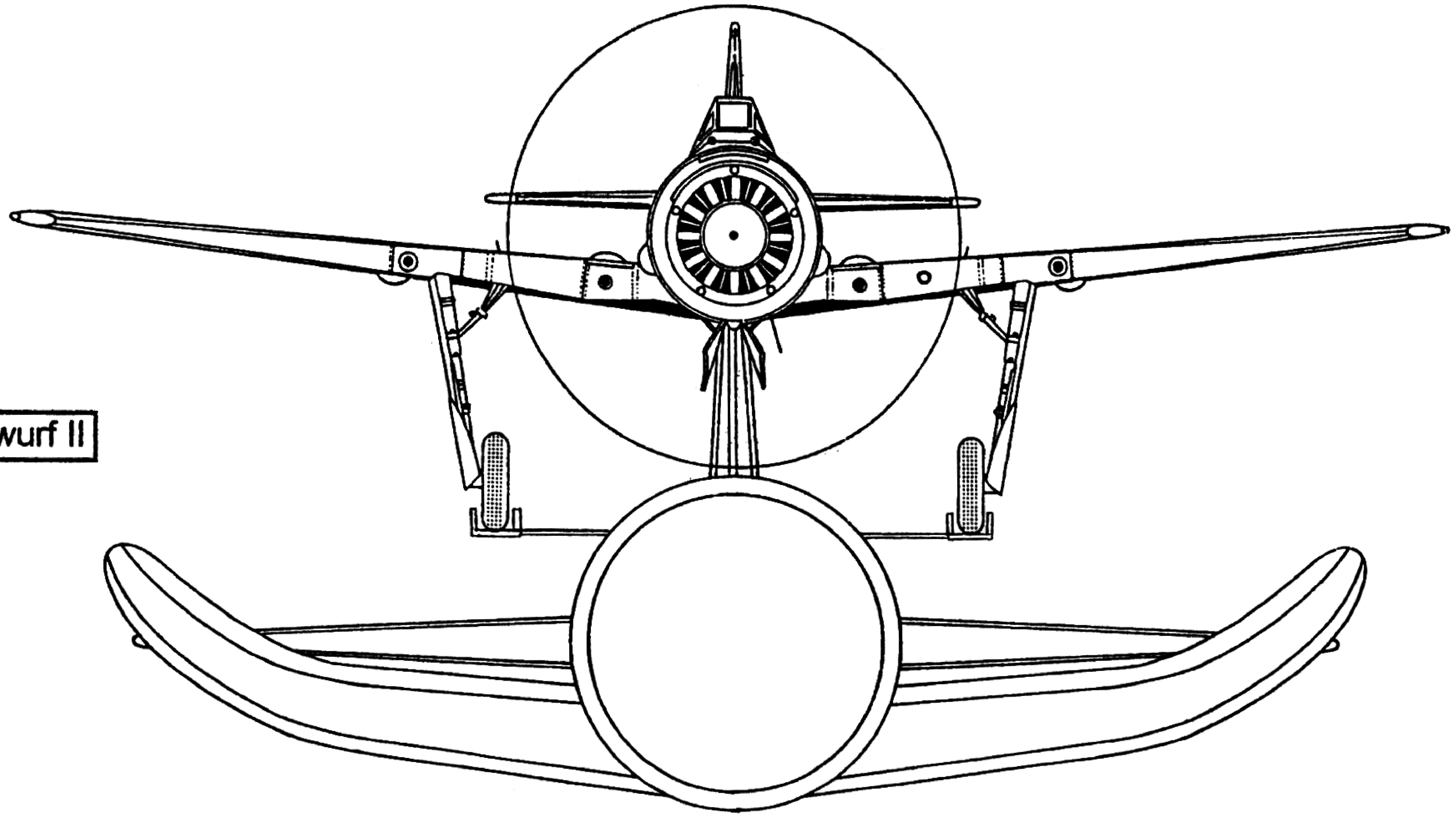
Entwurf II

1/72 scale

Siebel-Mistel Projekt



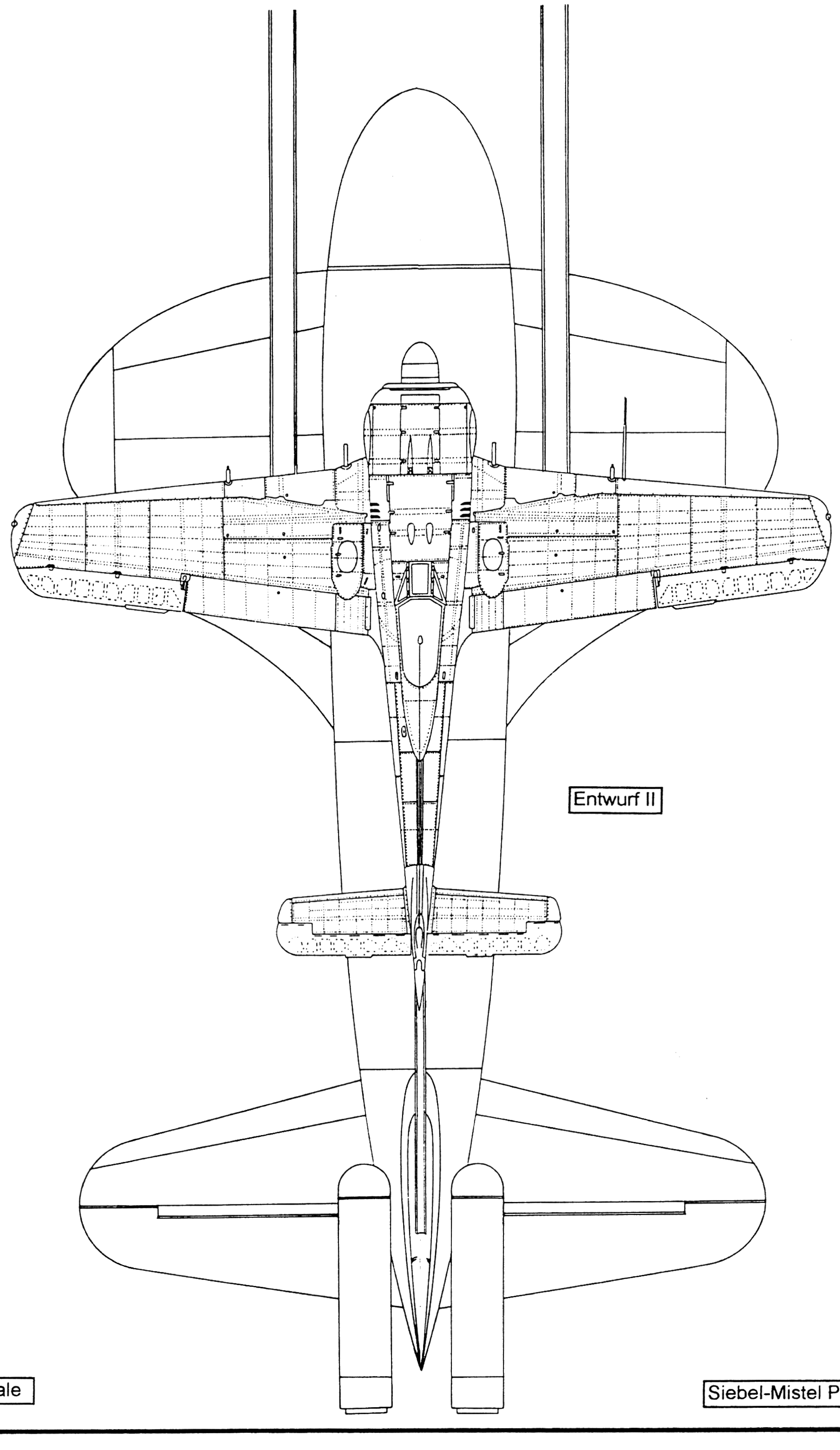
Entwurf I



Entwurf II

1/72 scale

Siebel-Mistel Projekt



1/72 scale

Siebel-Mistel Projekt

Siebel Mistel Projekte

Two variants of the Mistel weapons system, based on the use of two big cargo gliders powered by rockets, were designed in 1944.

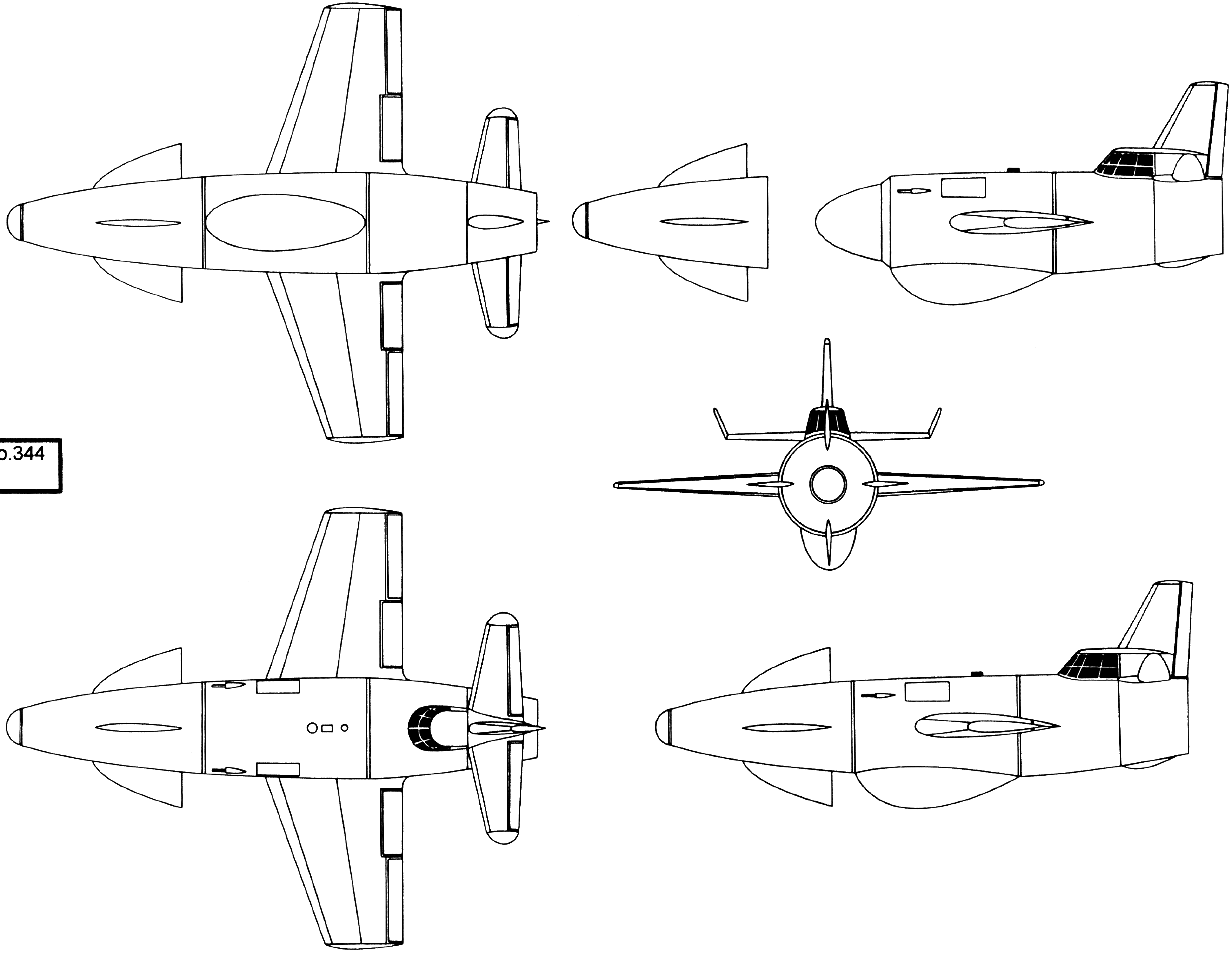
In the first design, the glider would take off with the help of a ramp using four Rheinmetall-Borsig rockets with 14,000 kp thrust. Once in the air, it would fly using the power of the BMW 801 in the guidance plane until reaching the launch area.

The inertial autopilot was connected once the airplane was pointed towards the target and then the Fw 190 detached itself and returned to base. The Siebel could transport a load of explosives three times bigger than the conventional Ju 88.

There was also a naval version dedicated to coast defence. The Siebel floated over short wings powered by a guidance airplane until the enemy fleet was sighted. It was then pointed towards it, the rockets ignited and the airplane took off with the help of the rails installed on the hull, leaving the Siebel in collision course against the enemy ships.

TECHNICAL DATA

Type	Mistel device
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Wooden structure and cladding
Landing gear	None
Engine	Four solid fuel Rheinmetall-Borsig 109-545 boosters wth 14,000 kp. static thrust each
Fuel tanks	None
Armament	One HE hollow charge in the nose of up to 10,000 kg
Wingspan	(Entwurf I) 22.4 m (Entwurf II) 9.4 m.
Length	(Entwurf I) 17.7 m (Entwurf II) 21.6 m.
Height	5.47 m.



Sombold So.344
1/72 scale

RAMMSCHUSSJÄGER SOMBOLD SO-344

This aircraft was deigned by engineer Heinz G. Sombold of the firm Bley placed in Naumburg/Saale in January 1944.

Originally conceived as a parasite escort plane, the design was altered to obtain a weapon able to break Allied bomber formations over Germany.

A specially converted bomber carried the device to the enemy lines and launched it at a height of 400 m.

Then, it began a parabolic approach flight propelled by the Walter rocket to avoid the enemy fighters.

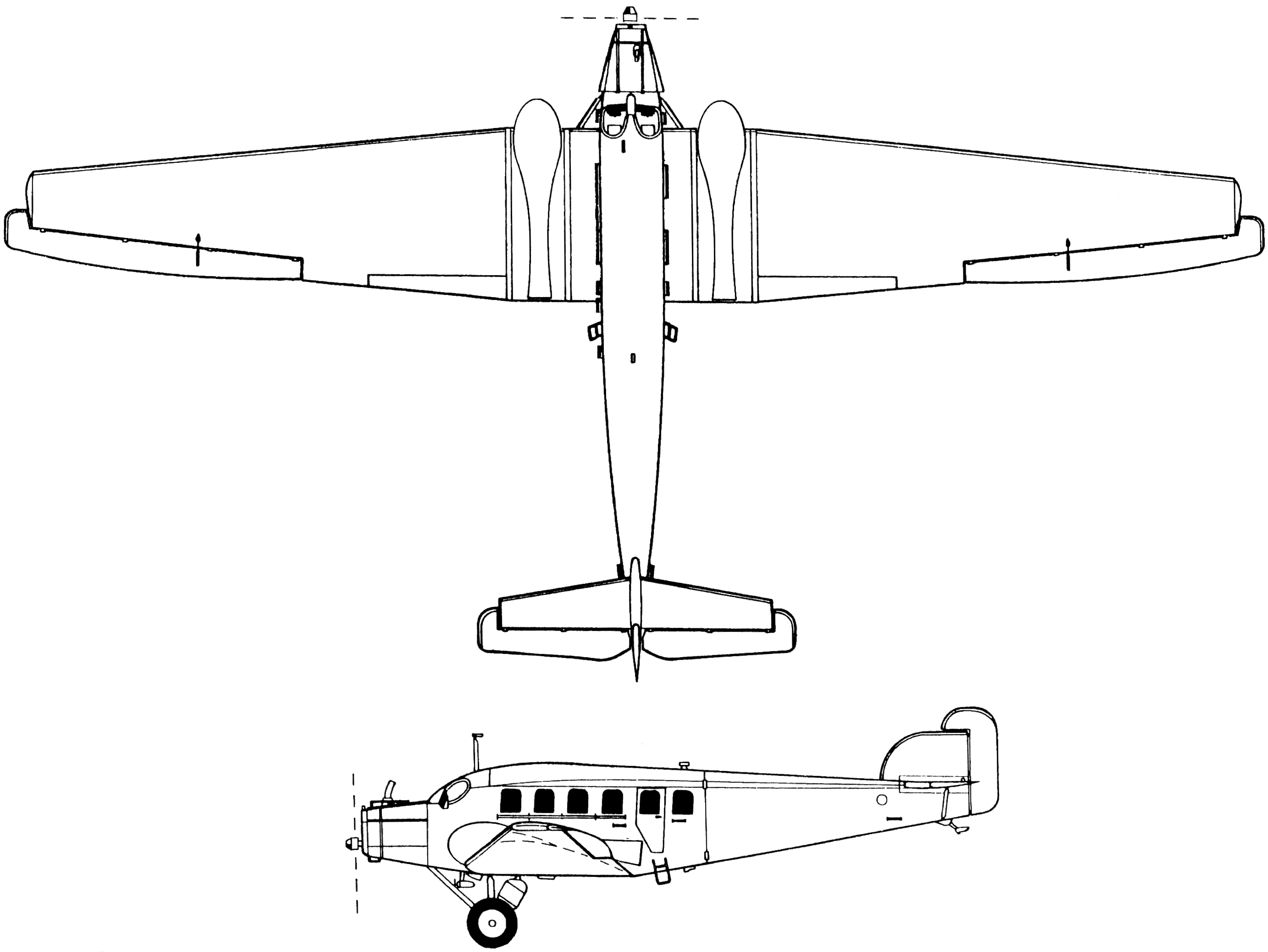
The pilot dived in at a 45 degree angle, following a collision path with the center of the enemy "box", then released the explosive nose and maneuvered to avoid collision.

In opposition to models "Komet" and "Natter", the So-344 kept propellant enough to escape after the attack and was fitted with machine guns for its self-defense.

It had landing skids very similar to the ones used by Heinkel in the "Julia" project. The works about the So-344 were abandoned at the beginning of 1945 when a 1/5 scale model for aerodynamic tests already existed.

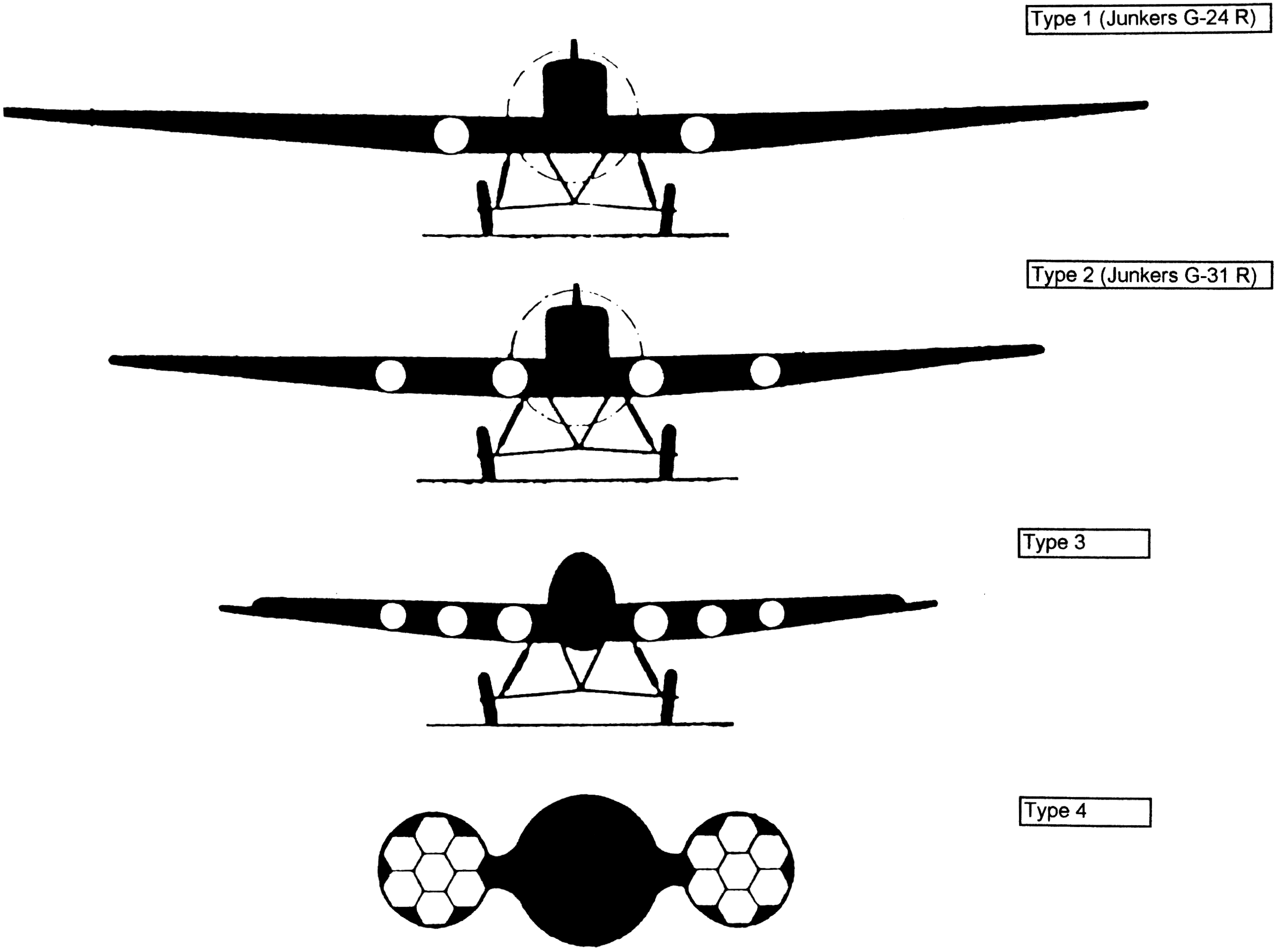
Technical data

Stage	project
Structure	Wood and plywood
Powerplant	A Walter 509 with a thrust of 600 kg (1,320 lb.)
Propellants	T-Stoff and Z-Stoff
Pressurizer	Compressed air
Guidance	pilot piloted
Equipment	Inertial auto pilot, armored plates for engine and pilot.
Armament	Fighter version was fitted with two MG series machine guns and a MK gun. The attack version had a detachable charge of 500 kg (400 kg of Amatol) in the nose, was stabilized by fins, and fitted with a proximity fuse of an unknown type. It kept the two MG machine guns.
Span	5.7 m (18 ft. 1 1/2 in.)
Length	7 m (22 ft. 11 1/2 in.)
Height	2.18 m (7 ft. 1 4/5 in.)
Lifting surface	6 m (66 sq. ft.)
Launch weight	1,350 kg (2,970 lb.)
Flying time	25 to 30 min.
Crew	1pilot

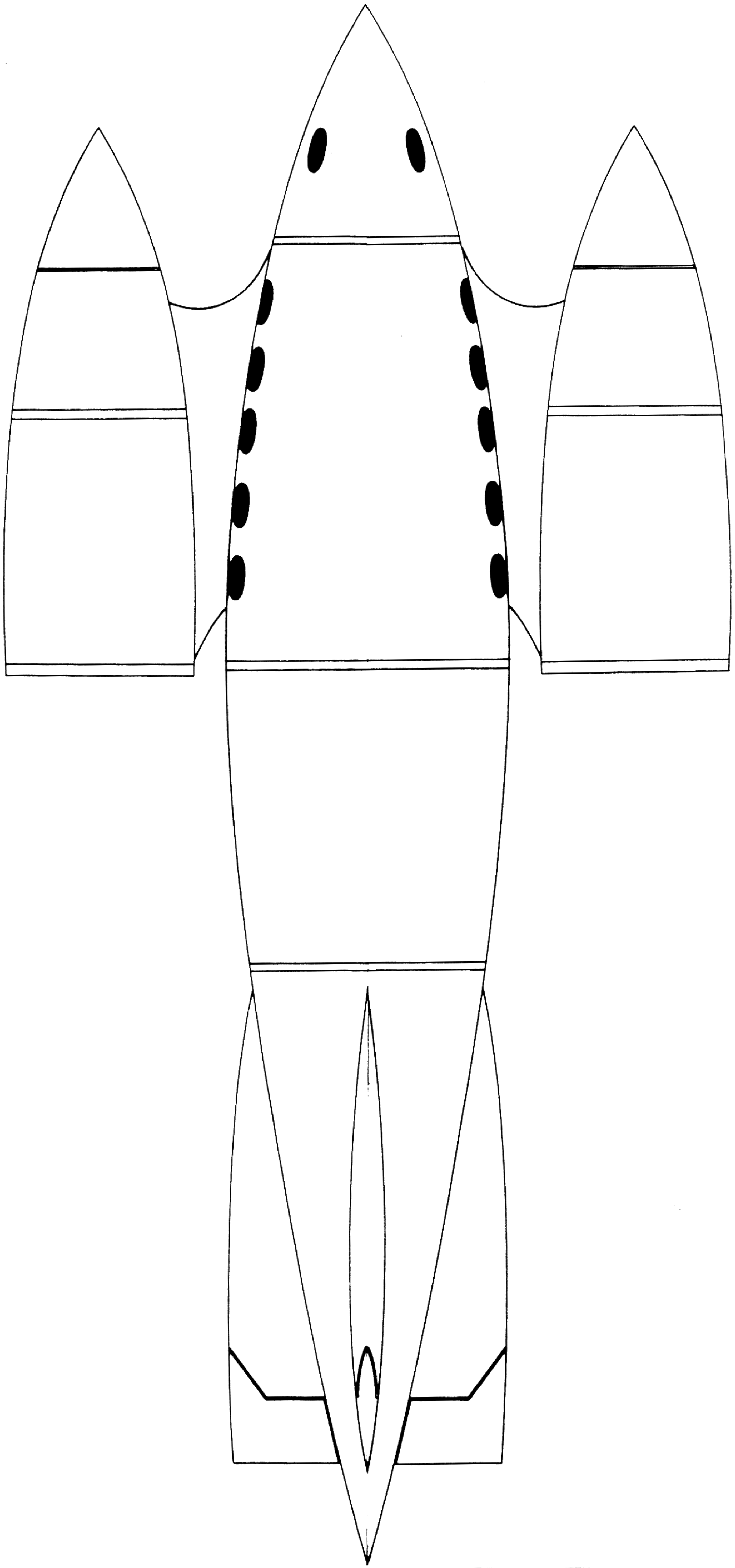


Type 1 (Junkers G-24 R)

VALIER ROCKET AIRPLANE 1927



VALIER ROCKET AIRPLANE 1927



VALIER ROCKET AIRPLANE 1927

Type 4

1/72 scale

Valier Rocket Airplane 1927

During the Spring of 1929, the German physicist Max Valier, pioneer in the research about liquid fuel rockets, gave a lecture in the WGL (Scientific Society for Aeronautics) during which he proposed it use to power civil airplanes.

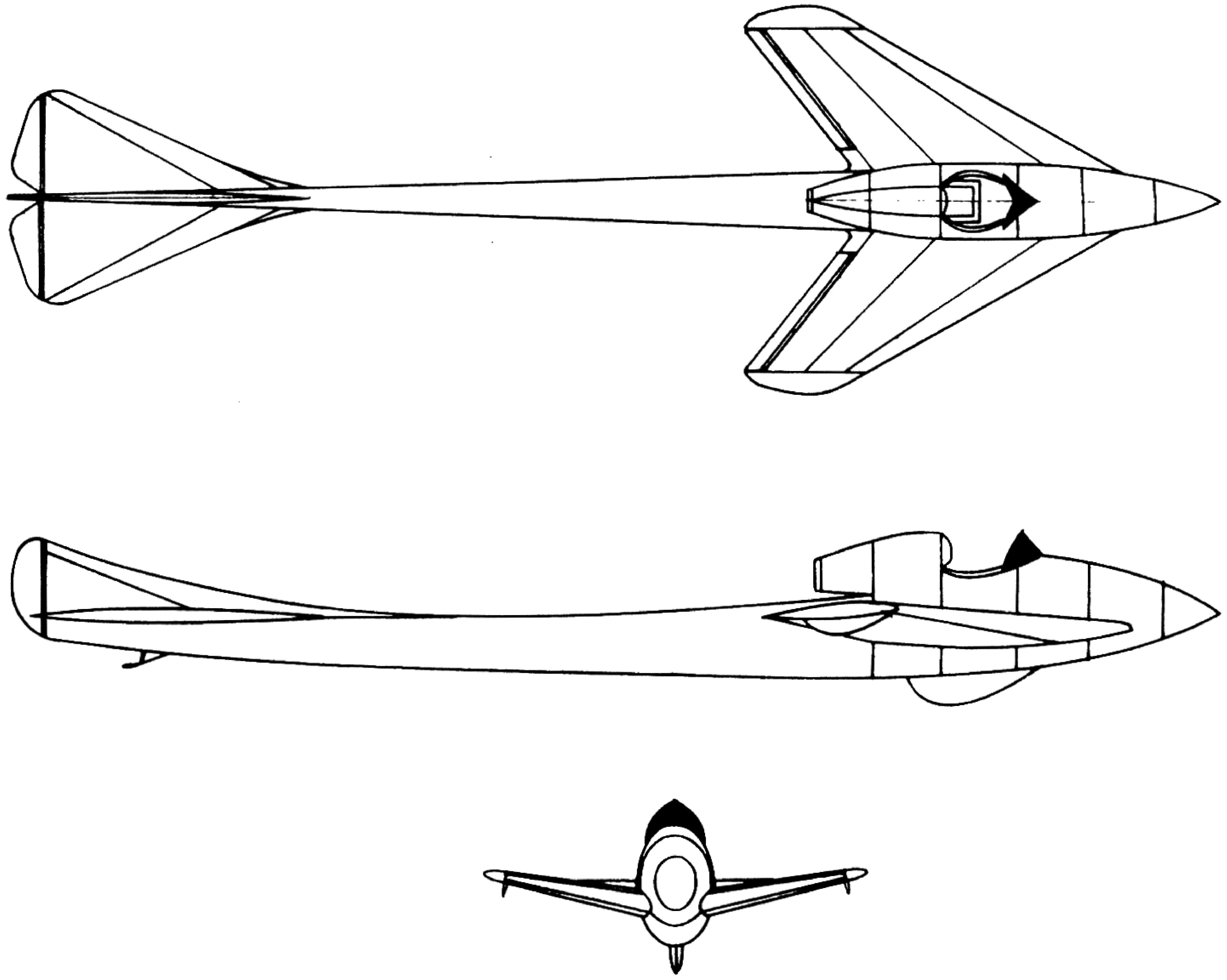
His project consisted of replacing the side engines of a Junkers G-24 airliner with two Valier (Type 1) rockets leaving the piston engine of the nose for safety.

With the experience obtained, four engines were installed in a Junkers G-31 (Type 2) that would be faster and would need a shorter wingspan.

The process would be stressed by adding the number of rockets and decreasing the wingspan until obtaining a pure rocket-airplane (Type 4) with small wings and pressure-cabin, suitable for intercontinental flights in the stratosphere.

TECHNICAL DATA

Type	Rocket airliner
Phase	Design
Wings	Metallic structure and cladding
Fuselage	Metallic structure and cladding
Landing gear	Conventional retractable with tailwheel
Engine	Fourteen bifuel Valier rocket
Fuel tanks	Of petrol and liquid oxygen, in the fuselage
Armament	None
Wingspan	7.92 m
Length	17.28 m.
Height	3.09 m.
Maximum speed	1,500 m/sec
Ceiling	250,000 m.
Range	5,000 km.



VALIER RF-1

1/72 scale

Valier RF-1

Airplane designed in 1929 to the purpose of crossing the Channel in a four minutes flight, exclusively powered by rockets.

The advertising success of the flight would expectedly attract financing for this type of research.

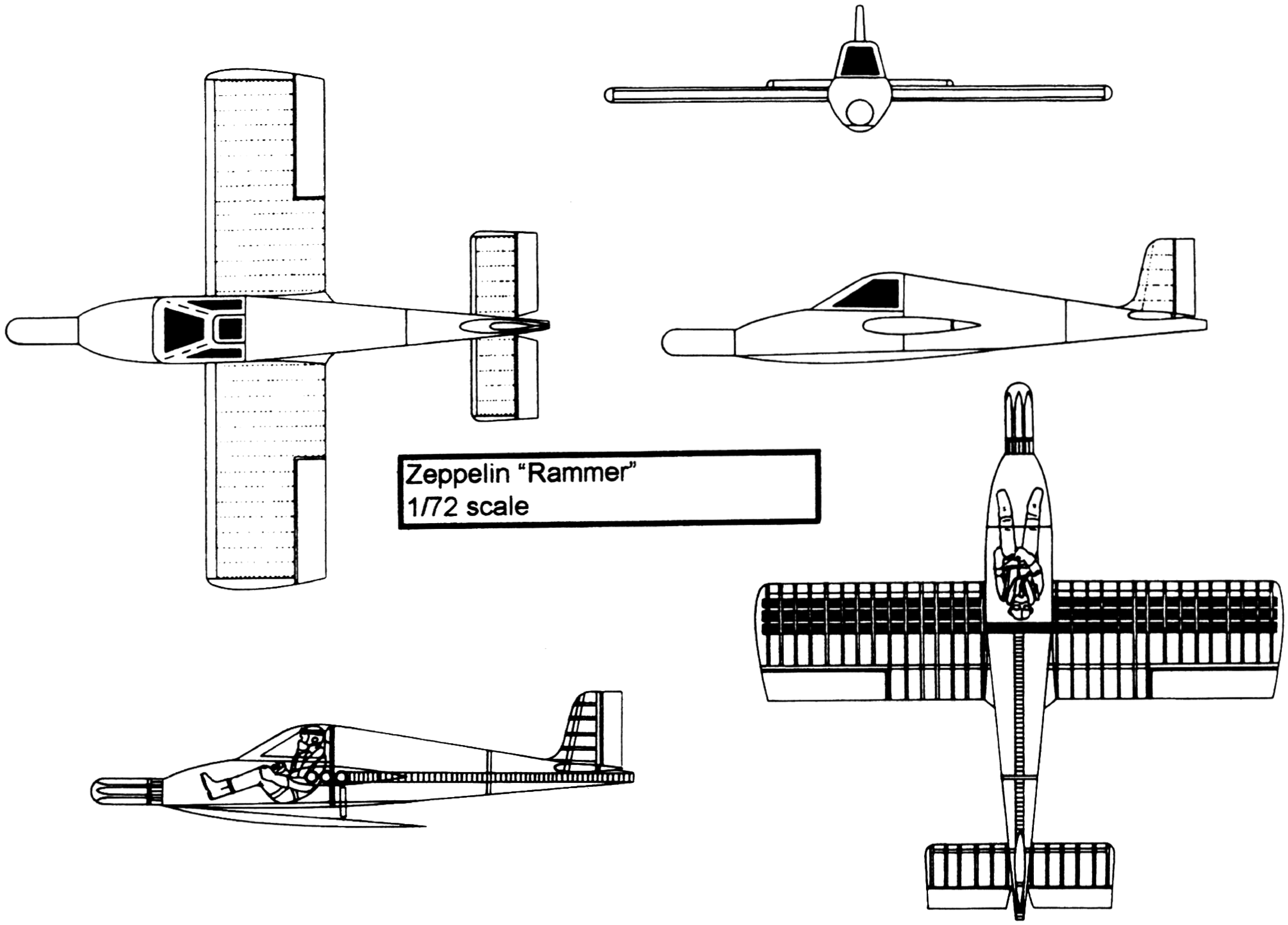
The airplane should have been built at the Espenlaub gliders manufacturing under the name RF-1 (Raketenflugzeuge - 1)

Based on the same principle but much bigger in size were the designs of the transatlantic seaplanes Types 10 and 11 that could fly between Berlin and New York at 50,000 m. in one hour

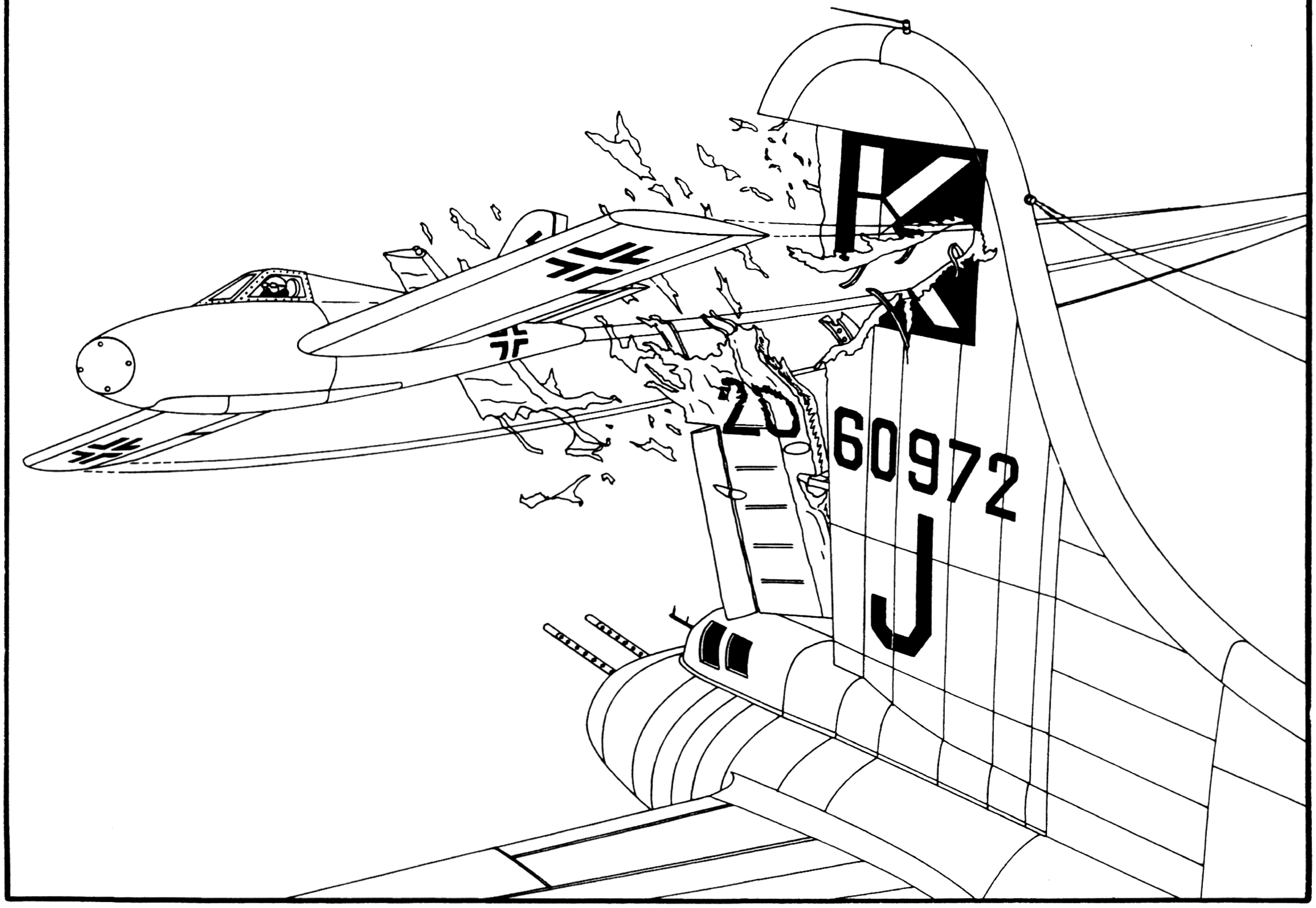
The sudden death of Valier during the test of its rockets prevented the continuation of these projects.

TECHNICAL DATA

Type	Record rocket plane
Phase	Design
Wings	Wooden structure and cladding
Fuselage	Metallic front. Rest in wood.
Landing gear	Three fixed skids to wings and fuselage
Engine	One bifuel Valier rocket
Fuel tanks	Two of methanol and LOX in the fuselage
Armament	None
Wingspan	3 m
Length	8.8 m.
Height	1.2 m.
Maximum speed	740 km/h
Range	40 km.



Zeppelin “Rammer”
1/72 scale



ZEPPELIN "RAMMER"

This project for a glider fighter was proposed by the RLM in November 1944. The take-off was to be made using a detachable device similar to the BV 40's, and afterwards moved to the combat area towed by a conventional fighter (probably a Bf 109G).

After being released, the pilot ignited the auxiliary rocket and accelerated to 970 km/h to then launch its bunch of rockets against the "box" of enemy bombers, like a "Natter".

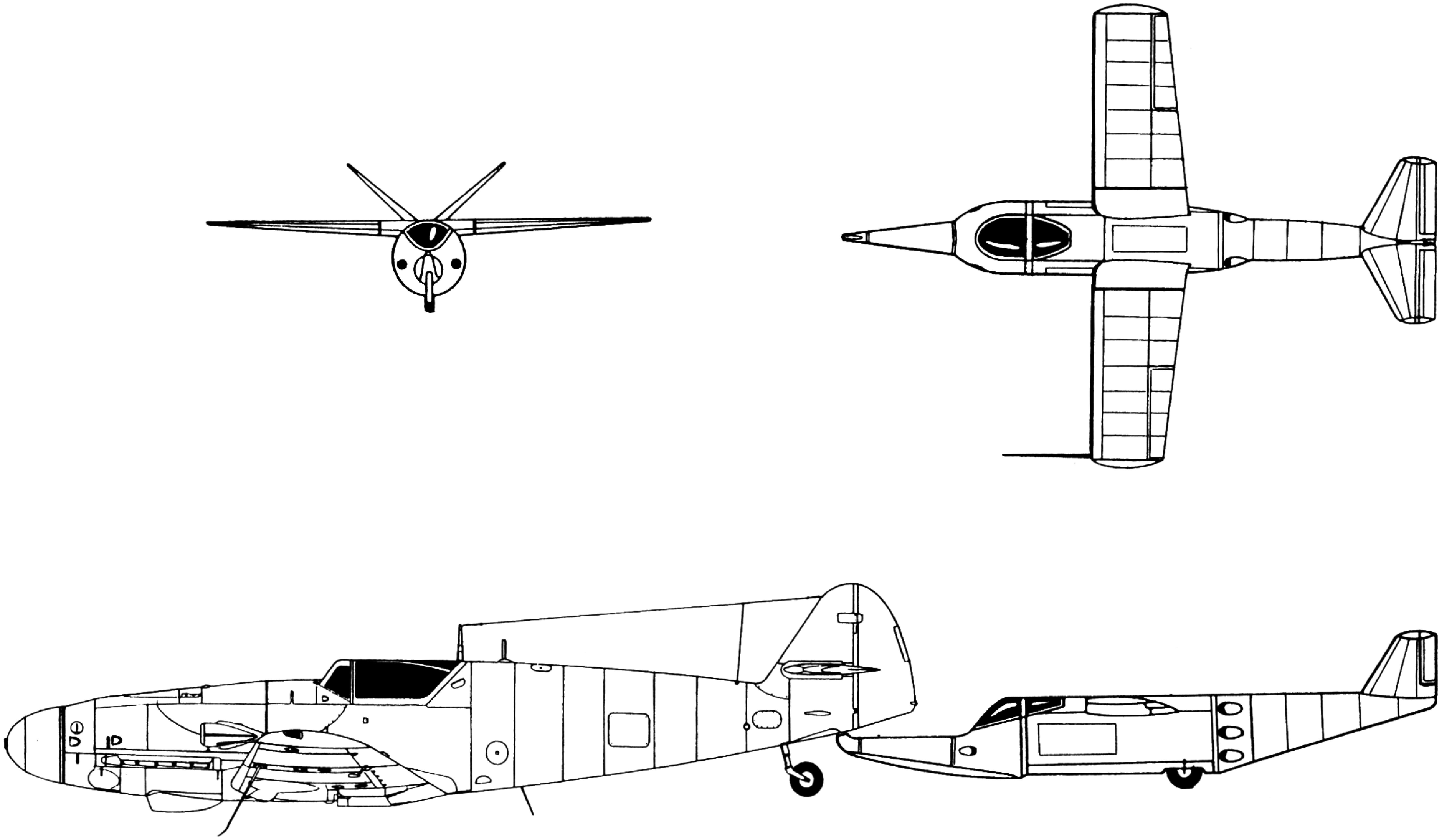
A second attack had been foreseen as in the BV 40, but instead of a towed mine the weapon would be the airplane's own wings built from a high resistance material for ramming purposes, similar to those made by the Fw-190 A-8/R2 of the IV/JG3.

The designer estimated that the wing of a "Rammer" could cleanly cut the tail of a "Flying Fortress" without great loss of speed or stability for the fighter.

The return was in a gliding flight, and the landing was made by means of a retractable skid as in a Me 163.

Technical Data

Type	Glider fighter
Stage	project
Wings	Metallic structure and coating, internal reinforcement with three tubular steel spars, cutting and reinforced leading edge.
Fuselage	Metallic structure and coating, frontal armor of 28 mm and dorsal armor of 20 mm, armored glass of 80 mm for the windshield and of 40 mm for the lateral glasses.
Tail unit	Metallic structure and coating.
Landing gear	Retractable skid with shock absorbers
Auxiliary engine	Rocket Schmidding 109-533 of 1,000 Kp using solid propellant. It had a length of 2.74 m and a diameter of 137 mm. It was attached by its front part to the last wing spar, which ran through the inner part of the rear fuselage to the tail.
Armament	Fourteen rockets R4M of 55 mm inside a cylindrical container fitted to its nose
Wing span	4.9 m (16 ft. 7/8 in.)
Length	5.1 m (16 ft. 8 5/8 in.)
Height	1.2 m (3 ft. 1 1/4 in.)
Launch weight	860 kg (390 lb.)
Attack speed	970 km/h (600 mph)



Zeppelin “Fliegende Panzerfaust”
1/72 scale

Zeppelin "Fliegende Panzerfaust"

A rocket powered glider fighter, it took off towed by a Messerschmitt Bf 109 G that released it near the formations of enemy bombers.
The attack speed was achieved with the help of six small rockets of solid fuel. It shot two RZ65 rockets at 100 m. from the target and flew off gliding.

Previous to landing, the pilot detached the forward part of the fuselage and bailed out with his parachute. The airplane also came down with its parachute and it was recovered for a new mission.

TECHNICAL DATA

Type	Light interceptor
Phase	Design
Wings	Wood structure and wood cladding
Fuselage	Metallic structure and cladding with the pilot in prone position
Landing gear	An only wheel under the fuselage
Engine	Six rockets of solid fuel
Armament	Two Rheinmetall-Borsig RZ 65 rockets
Wingspan	4.5 m
Length	6 m
Height	1.5 m
Wing area	3.8 m^2
Maximum weight	1,200 kg
Maximum speed	850 km/h